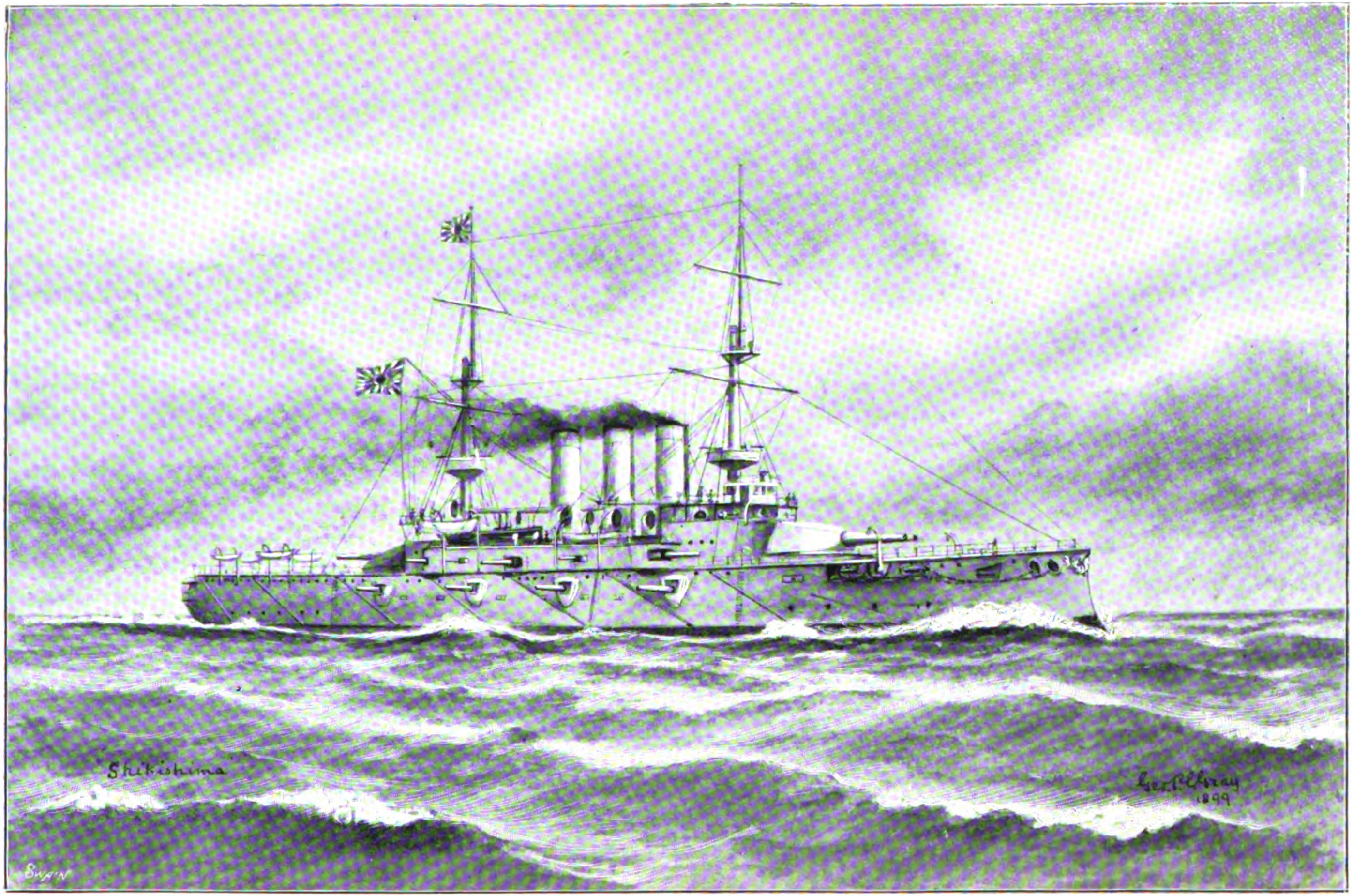

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THE

NAVAL ANNUAL,

1899.

EDITED BY

T. A. BRASSEY.

PART I.—Lord BRASSEY, K.C.B.; Colonel Sir GEORGE CLARKE, K.C.M.G., F.R.S.; Captain C. ORDE BROWNE; Lieutenant-Commander W. H. BEEHLER, United States Navy; Messrs. G. R. DUNELL, J. LEYLAND, the EDITOR, and two anonymous contributors.

PART II.—Lists of Ships: Commander C. N. ROBINSON, R.N.; J. LEYLAND; Plates: S. W. BARNABY, M.I.N.A.

PART III.—Captain ORDE BROWNE, late R.A., Lecturer on Armour to the R.A. College.

PART IV.—FIRST LORD'S MEMORANDUM, NAVY ESTIMATES, and STATEMENTS WITH REGARD TO NAVAL RESERVE.

1899.

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PREFACE.

THE readers of the *Naval Annual* of 1899 will miss the names of two regular contributors to former volumes. M. Weyl has felt it necessary to withdraw his valuable services in consequence of the feeling towards France displayed in England over the Fashoda question. The relations between the two countries are now on a more friendly footing, and it is to be hoped that M. Weyl may next year again take charge of the "Progress of Foreign Navies." Mr. Thursfield does not give his usual chapter on Manœuvres, partly because there were no British Manœuvres to discuss, partly on account of his absence abroad. Mr. Leyland and the editor have done their best to supply the places of M. Weyl and Mr. Thursfield.

The new features of the present number are an account of the United States Navy, by Lieut.-Commander W. H. Beehler, of the Naval Intelligence Office at Washington (who has received cordial assistance from the staff of other departments); a review of the Spanish-American war by Colonel Sir George Clarke; an interesting description of the operations of the gunboats during the Nile expedition, and some very opportune considerations as to where we ought to fortify, and to what extent, the two latter by contributors who wish to remain anonymous. Mr. Dunell has been able at the last moment to contribute his usual chapter on Marine Engineering. Had we not anticipated that he would be prevented by illness from doing so, we should have left some of the trials described in Chapter I. in his much more competent hands.

Lord Brassey contributes a general review of the British Navy, written in Australia at the end of 1898.

Parts II. and III. remain in the same hands as before. Part II. includes many new plates, and a large number of others have been reduced in size or re-drawn, with the view of showing more clearly the figures as to armament and armour.

In conclusion, we must express our thanks to the Admiralty for kindly supplying us with drawings of the Formidable and Cressy classes, and to many British and foreign shipbuilders for giving us valuable assistance. It is almost unnecessary to add that where official information fails, we are largely indebted to the naval correspondents of the public press.

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PART I.

INTRODUCTION.

The State of the Navy 1898–99.

In reviewing the state of the Navy, an old Secretary to the Admiralty naturally turns to the latest estimates submitted to the House of Commons. The proposals of Mr. Goschen for 1898–99, provided for an aggregate expenditure on the naval services of the British Empire, of £24,000,000. Over £8,000,000 were appropriated to New Construction, including the laying down of three battleships, four large cruisers, and four small vessels. Later in the session, a supplementary estimate was approved, providing for work on four additional battleships, four cruisers, and twelve torpedo-boat destroyers. The two programmes will involve an expenditure of £15,000,000 spread over four years.

Recent expenditure.

The *Nineteenth Century* of April, 1898, contained a masterly review of recent shipbuilding for the Navy, from the pen of Sir William White. Dealing first with expenditure, it is shown that in the eleven years ending 31st March, 1898, no less than £49,500,000 had been spent on building new ships for the British Navy. These figures are exclusive of cost of guns. The average annual outlay had been £4,500,000, or twice the annual expenditure for the eleven years ending 31st March, 1887. For the last four years the expenditure on shipbuilding has averaged £5,600,000. To the expenditure on ships we have to add that on armaments, amounting for the last eleven years to £11,000,000, thus bringing the total appropriation to ships and armaments to no less than £60,000,000. If the intentions of 1898–99 were realised, £9,000,000 would be expended within the year. Since the publication of Sir William White's paper, the supplementary estimates already referred to have been approved, thus raising the total expenditure to not less than £10,000,000, an amount which will largely exceed that of France, Russia, and Germany combined. The relative progress of construction for the British Navy is more than proportionate to the excess of expenditure.

While the cost of a British first-class battleship may be taken at £880,000 to £900,000, in the French Navy, for ships of smaller dimensions, the cost would exceed £1,000,000. Our cruisers ranging

from 11,000 to 14,000 tons, cost £500,000 to £700,000. The cruisers built for foreign navies, though of inferior tonnage, cost from £800,000 to £900,000. The lower cost at which we are able to build is largely due to the private industry of the country.

As Sir William White remarks, the recent re-construction of the Navy is an achievement largely due to the magnificent and unrivalled engineering and shipbuilding resources of the country. It would have been impossible elsewhere. France has only four shipbuilding yards capable of constructing cargo boats exceeding 2,000 and 3,000 tons, and the prices range from 35 to 80 per cent. in excess of the English prices. In England, private firms have built nearly half the ships laid down in recent years, and they have supplied the dockyards with all the materials of shipbuilding—the armour, the guns, the gun-mountings, the auxiliary machinery, and nearly all the propelling apparatus. In so far as relative strength can be measured from a comparison of estimates, the figures quoted must convey the assurance that the British Navy is not falling behind.

Manning of the Navy.

Turning from the expenditure on construction to the men, our permanent force for the sea service, as voted by Parliament for 1898–99, numbers 106,390 officers and men, as against 42,000 for the French Navy, and 38,000 for the Russian.

In view of the recent rapid increase in the fleet, and looking to the necessity for sustained efforts in order to assure our maritime supremacy, the manning of the Navy for war demands the most serious consideration. The complements required for the new ships have thus far been provided chiefly by an increase of the numbers on the active list. The total strength of officers and men has been raised from 62,400 in 1888 to 106,300 at the present time. If we continue to build up our permanent force at the rate which has lately been maintained, a heavy, and to some extent unnecessary, burden will be thrown upon the taxpayers. The gross expenditure for the *personnel* of the Navy has increased from £5,060,000 in 1866–67 to £8,896,000 in 1897–98. In 1866 the non-effective vote slightly exceeded £500,000. It stands to-day at £1,104,000. In future years the non-effective vote will bear a further heavy charge for pensions, which will become payable to the officers and men recently added to the Navy.

Marines. The training of the marines is less costly than that of seamen, and in a mastless fleet we may look for a gradual increase in the

marines and a reduction in bluejackets. Service at sea being however, essential to secure the seaman-like qualities required in an amphibious force, it is not possible to increase the marines to such a strength as would relieve us of the necessity for raising a naval reserve.

Reserves: Mercantile Marine.

It might naturally be expected that the first reserve of the Navy should be supplied from the Mercantile Marine. In point of fact, the merchant service has never at any period of our history contributed largely to the manning of the Navy. In the revolutionary and Napoleonic wars a sudden and large increase of 40,000 seamen was voted for the Navy. Numbers so considerable were not, and could not have been supplied by the mercantile marine. The complements were filled up by entering landsmen, boys, and fishermen. Recent changes have not tended to the improvement of the Mercantile Marine as a reserve for the Navy. The Suez Canal and the consequent rapid increase in steam tonnage have produced a marked effect in increasing the proportion of foreign seamen in British vessels. A Board of Trade Return of March, 1896, gives the statistics of the position. It is shown that while 180,366 seamen were employed in British ships, no less than 27,446 were foreigners, and 27,911 Lascars. Comparing 1891 with 1896, British seamen had diminished by 6,570, while foreigners had increased by 1,037. In the last session of the Imperial Parliament sanction was obtained to a proposal by the Board of Trade for a reduction of light dues by £62,000, and for the payment of a subsidy to ships carrying a certain number of apprentices. To earn the full amount of £63,620, it would be necessary to carry 16,000 boys. Although the terms were not considered sufficiently liberal by the ship-owners, the proposal implies an acknowledgment on the part of the Government that its fostering care is needed in order to create a nursery of seamen for the Navy.

Fishermen.

Having done what we can to improve the Mercantile Marine, we must look to the fishermen and the long-shore men, not only at home but in the Colonies. It is computed that 100,000 men are employed in the fisheries of the United Kingdom, and approximately the same number in the fisheries of the Colonies. The enrolment and training of the fishermen employed in home waters have long engaged the attention of the Admiralty, and the system as at present established leaves little to be desired.

Colonies.

Turning to the Colonies, the policy of raising a Colonial Naval Reserve has been advocated for many years in the columns of the *Naval Annual*. The idea was first suggested to the present writer during a cruise in Canadian waters in 1872. Taking the number of

hands employed in the fisheries of the Canadian Dominion at 50,000, it is evident that a reserve of at least 10,000 men could with little difficulty be raised. In Australasia there are no fisheries on a large scale, but a recent return gives a total of 32,510 men engaged in seafaring pursuits. From such a body a Naval Reserve could certainly be recruited, sufficiently strong to complete the crews of ships on our most distant station.

Mr. Goschen's conditions. The conditions on which the Admiralty insists were stated by Mr. Goschen in reply to a deputation of the Empire League.* The Colonies will be expected to provide the batteries for drill. The charge for pay and allowances will be borne by the Imperial Exchequer. The men will be required to put in 28 days' drill annually and to serve for six months on a man-of-war, during their first period of five years. In Australia we are fully prepared to comply with the conditions laid down, in respect to batteries for drill. There may be some reluctance on the part of the Colonial seamen to accept the low scale of remuneration established in the Royal Navy. Matured seamen in the Colonies could not be expected to serve six months afloat at naval rates of pay. This difficulty may be met by putting in the qualifying service afloat at the age of eighteen years. The younger the seaman, the easier it must be to acquire the habits of discipline maintained in the Navy. The 28 days' annual drill offers to seafaring men the boon of a spell on shore, while the total sum which a trained man in the Reserve would receive would amount to £8 a year. The conditions as to pay during the annual training in a battery or port guardship should not be unacceptable.

Naval Defence of Empire. The questions raised in connection with the enrolment of a Colonial Naval Reserve in some degree involve the consideration of the whole subject of the co-operation of the colonists with the mother country in the naval defence of the Empire. Direct contribution, in sufficient amount to afford substantial help, implies the full representation of the Colonies in a council by which the foreign relations of the Empire would be controlled; and grave obstacles lie in the way of the adoption of any scheme as yet proposed. Although no formal engagements have been made, no important step affecting the interests of the Colonies would now be taken without consultation, and for many years no friction and no conflict of interests has embittered the relations between the mother country and the Colonies. It would be rash to make any sudden changes in a method of dealing with important affairs which is working well.

* *Cf.* Part IV., p. 459.

Military Defence. Having undertaken the naval defence of the Empire, the Imperial Government reasonably looks to the Colonial Governments to provide the necessary military defence. Under the scheme prepared by the Government of New South Wales, and approved, in 1894, by the military commandants of the whole of Australia, and in the following year by the premiers, a federal field force of 12,000 men has been organised. The number of men is fully maintained, and their equipment is fairly complete. More thorough training of officers and men is doubtless desirable. Money spent in perfecting the military defence of the Australian Colonies would do more to strengthen the Empire than a trifling contribution to the enormous annual expenditure on the Imperial Navy. The military forces of these Colonies would be certain to volunteer for service elsewhere if the necessity arose. In Australia we have the nucleus of a local Navy force. So long as the happy and cordial relations which prevail to-day are maintained, all forces we create, whether Imperial or Colonial, are available for mutual protection.

Training. The training of the Navy, though of vital importance, need not detain us long. It has been truly said that the naval officer cannot be made without constant experience of the sea. "His proper training ground is the quarter-deck and the bridge of a sea-going ship at sea. It is not the mastery of scientific appliances, nor the chamber or lecture-room study of the sciences on which they depend, that makes a man a seaman of the type of Nelson and his officers. The sea itself is the one element of a seaman's experience that cannot be reduced to book knowledge, and must be assimilated on the quarter-deck. A man is no more a seaman by scientific study on shore than he is an athlete by a knowledge of human physiology or of the chemical properties of food." In the early stage of a naval career service in a training squadron has a most valuable influence on the seaman-like qualities and aptitudes of officers and men. It would be well, but with only four ships it is not possible, that all should pass through the training squadron. It seems almost necessary that a second squadron should be maintained.

For the general instruction of the Navy, and as the best means of testing the qualities of new ships in a practical way at sea, naval manœuvres on a large scale are indispensable. It is desirable that they should take place every year. Mobilisations might with advantage extend over a longer period of time than has sometimes been given to this most important duty.

Value of Training. Recent naval wars have taught some important military lessons. In the China-Japanese war the value of prepapation was conclusively shown. It was by their superior professional ability—the result of

careful training—that the Japanese obtained the command of the sea. Off the Yalu the Chinese lost some small cruisers, but their two armoured battleships were in a condition to continue to fight. Their heavy guns were absolutely unharmed. The Japanese Fleet suffered so severely in the engagement that it was compelled to draw off. The ships were powerful, but the Chinese Navy signally failed, because the commanders were incapable of making effective use of the material at their disposal. The lessons of the Yalu have been confirmed by the engagements in which the Spanish fleets were annihilated by the naval forces of the United States. As in the engagements between the Japanese and the Chinese, so in those lately fought between the seamen of Spain and the United States, superiority in gunnery, the result of more careful training, promptly decided the issue.

Shipbuilding.

Battle-ships—British. Turning to shipbuilding, let us deal, in the first place, with the battleships. Those recently built for the British Navy represent two types, both of equal merit and not surpassed elsewhere. The Majestic class have a displacement of 14,900 tons and a mean draught of 27 ft. 6 in. The Canopus class have a displacement of 13,000 tons and a mean draught of 25½ ft. The 2000 additional tons of the Majestic are almost entirely absorbed in the increased weight of armour. The Majestic class are favourite ships with naval officers, and are justly commended for perfection of design. They show a decided advance on the ships of the Admiral type, both in height of freeboard and in the protection of the secondary armament. Exposed as all ships—the biggest not less than the smaller—are, and in an equal degree, to fatal injury by the ram or the torpedo, there are arguments, as Capt. Eardley-Wilmot truly says, of cogent force which may be urged for a due representation in the Navy of types of more moderate dimensions. These we have in the Canopus class. To abandon the policy of constructing such ships would not commend itself to the present writer as a wise decision.

Foreign. Turning to the French Navy, the latest design for a first-class battleship is represented in the Iéna recently launched at Brest. Displacement 12,052 tons; speed, 18 knots. Protection is afforded by a continuous belt along the water line, tapering from 14 in. amidship to 6 in. at the extremities. The decks are less heavily armoured than in the British types. The armament includes four 12-in. guns, mounted in pairs in turrets at the middle line. The secondary

battery contains eight 6·4-in. quick-firers in armoured casemates on the main deck. In the French battleships the large area of side unprotected by armour is a serious defect, for which, as the experience of naval warfare has shown, the complete protection at the water-line offers no compensating advantages. In dimensions the French have never entered into competition with the British Admiralty. The opinion, however, is generally entertained that their armoured coast defenders of 6000 to 7000 tons are not equal in fighting efficiency to a single ship of twice the tonnage. The smaller ships have less speed. In bad weather their power of fighting an action might be seriously impaired, while a large ship would be well able to maintain the struggle. Many French battleships are overloaded with superstructures imperfectly protected, and with military masts of excessive proportion.

The battleships recently built for the United States Navy, though of smaller dimensions than the British ships, show no inferiority in armament and weight of armour. In coal supply and ability to keep the sea we have a decided advantage. The battleships recently added to the Japanese Navy are second to none in fighting efficiency.

Cruisers—British.

Turning from the battleships to the cruisers, the Terrible and the Powerful, lately built for the British Navy, are of dimensions hitherto unprecedented. Their great size was held to be necessary in order to secure a speed equal to the fastest ships afloat, whether in the fighting or mercantile navies, combined with a marked superiority in coal endurance. It was a somewhat rash venture to try a new description of boiler in ships propelled by the most powerful machinery which had ever been placed in a ship of war. It was not surprising to hear that, when first commissioned, the engines and boilers of these two great ships gave serious trouble. In the case of the Powerful, now on the China station, the difficulties experienced with the crank and main bearings on the outward voyage have been overcome, speeds at sea of over 20 knots having been maintained for 14 hours. In the case of the Terrible, still in the hands of Portsmouth dockyard, the steam trials show steady improvement. In a four hours' run in the Channel, a speed of 22 knots was maintained with a full supply of 2900 tons of coal on board.

The four first-class cruisers of the Cressy type, the latest designs approved for the British Navy, are intended to combine the best features of the Powerful and Diadem classes. The displacement is 12,000 tons. They will be protected by 1200 tons of armour. The belt will be 6 in. in thickness, 11 ft. 6 in. deep, extending 5 ft. below the water-line. The main armament includes two 9·2 in. 22-ton guns carried in barbettes protected with 6-in. armour; twelve 6-in.

quick-firers carried in casemates, and four on the upper deck and eight on the main deck; the speed will be 21 knots.

Cruisers—French.

Among the cruisers recently added to the French Navy, the Jeanne d'Arc, laid down at Toulon in 1895, merits particular notice. Displacement 11,270 tons; speed 23 knots. The normal coal supply of 1400 tons can be raised to 2100 tons, giving a coal endurance at 10 knots of 13,500 miles. The ship is protected by two armoured decks and by a belt tapering from 6 ins. to 3 ins. The armament includes two 7·6-in guns in turrets at each end of the ship; eight 5·5-in. guns in casemates, armoured on the external face, and numerous smaller pieces. The role proposed for the Jeanne D'Arc is that of an advanced guard to a fleet of battleships, seeking for and maintaining touch with the enemy. Cruisers of this type are protected against destroyers by their speed and armament, and should be able to fight a battleship for a short time. It is claimed by the French constructors that the Jeanne d'Arc is more powerful than any cruiser afloat. The Terrible and Powerful have 2,900 tons more displacement and a knot less speed. In armament they have no decided superiority. In coal supply they have a great advantage. The British cruisers of the Diadem class, of the same dimensions as the Jeanne d'Arc, carry 2000 tons of coal, giving an endurance of 10,000 miles at economical speed. Their speed does not exceed 20·5 knots. They have no side armour. In armament they are about equal to the French cruiser. The gain from the larger tonnage will doubtless be found in superior ability to keep the sea.

The Dupetit-Thouars, Gueydon, and Montcalm, lately commenced for the French Navy, may be briefly described. Displacement, 9515 tons; speed, 21 knots. Protection is given on the water-line by a belt of 6-in. armour, extending from the stem to near the stern. Above the 6-in. belt is a narrower belt of 4-in. armour. Armament two 7·6-in. guns in turrets—one forward and the other aft—and eight 6·4-in. quick-firers in armoured casemates. The Sully, Gloire and Condé, of yet later design, will shortly be commenced at Cherbourg. Displacement, 10,000 tons. The speed and armament are the same as that of the Montcalm, but they are rather better protected. Cost, £800,000.

Russian and German.

The Rossia displaces 12,130 tons, and is protected by side armour. The armament is heavier than that of the Jeanne d'Arc, but not so well protected. The German Fürst Bismarck displaces 10,650 tons, has a speed of 19 knots, and a coal supply of 1000 tons. The armament is more powerful and the armour heavier than that of the Jeanne d'Arc, but the area protected is proportionately less.

Criticism.

The cruisers recently constructed for the British Navy have been severely criticised by Mr. Hurd and other writers. Elaborate tables

of comparison have been prepared with a view to show that the superiority in speed, horse-power, and protection of armaments lies with vessels built in private yards for foreign navies. While acknowledging the skill and the ingenuity exhibited outside the Admiralty, in fairness it should be pointed out, that some compensating advantages may have been secured in the ships built for the British Navy. For example, the Buenos Ayres, recently constructed by the Armstrong firm for the Argentine Republic, has a length of 396 feet, to 310 feet in a British cruiser of even tonnage. The latter on the other hand has a beam of 49 ft. 6 in. to 47 ft. 2 in., and a mean draught of 19 ft. to 18 ft. Finer lines are more favourable for high speed, while the fuller midship section of the British ship should give greater power of contending with severe weather at sea. As to other essential details, a limited comparison can give no adequate information. Structural strength and freeboard are features of the utmost importance in relation to seaworthiness, and on these points the tables do not furnish, and could not furnish the details required. In British ships, as Sir William White points out in his paper in the *Nineteenth Century*, the development of sea-keeping qualities has been strongly insisted on. Formerly, smallness of the target was the object chiefly in view. Ships were built with low freeboard, and their guns were comparatively low. In smooth water, vessels of this type had a certain advantage. In a sea way the want of freeboard involves loss of speed and inability to fight the guns. Recent ships have more freeboard, and the guns are carried at a greater height above water. It has been suggested that the coal supply of British cruisers is excessive, and that the weight might have been applied to greater advantage in increasing protection and armament. It is an obvious answer that the mastless ship running short of coal is in a helpless condition. To give up coal involves a most serious sacrifice of fighting efficiency.

Speed.

The advance in speed in modern ships of the British Navy is a notable feature in our recent battleships. Taking those laid down from 1889 onwards, we have seventeen ships with natural draught speeds of 16¼ knots, two with speeds of 17½ knots, and ten with speeds of 18 to 18½ knots. Of the cruisers of recent design, fourteen have natural draught speeds ranging from 20½ knots to 22½ knots; sixty-nine from 18½ to 19½ knots; fourteen from 17 to 17½ knots.

Value of Armour.

The battle of the Yalu showed how effective is the protection afforded by armour, and that such protection is more necessary for the batteries and upper works than on the water-line. Given a certain weight disposable, it should not be appropriated exclusively to the water-line, which is seldom struck, leaving the batteries wholly

without protection even by thin armour. It is absolutely necessary to make fighting ships fireproof. The war, says Chief Constructor Hichborn, United States Navy, has further demonstrated the value of quick-firing guns and 8-in. guns. At Santiago, the secondary batteries of the Brooklyn and the Oregon were more effective than any other portion of their armament. The result of these comparisons goes to prove that as regards the amount of fighting efficiency obtained with a given weight of material built into a ship, there is no substantial difference in the designs produced by the skill and ingenuity of the eminent naval architect whose services to the British Navy we all acknowledge, and his contemporaries in the service of foreign countries. Every design must be a compromise between conflicting demands for increase of speed, coal-supply, armour, armament, and ability to keep the sea.

Comparative Strength.

We may now pass in review the comparative strength of the naval powers. As to ships, the latest official statement is given in a Parliamentary paper issued in July last.

The following tables exhibit the total number in each class belonging to each nation :—

VESSELS BUILT.

	Great Britain.	France.	Russia.	Germany.	Italy.	United States.	Japan.
Battleships	52	27	12	17	15	5	3
Cruisers, armoured	18	9	10	3	3	2	1
„ protected	95	30	3	7	15	14	10
„ unprotected	16	16	3	21	1	10	8
Coast-defence vessels, armoured .	15	14	15	11	—	20	3
Special vessels	3	1	5	1	2	1	—
Torpedo-vessels	35	13	17	2	15	—	1
Torpedo-boat destroyers . . .	50	—	1	—	—	—	—
Torpedo-boats	96	211	174	113	142	8	44

VESSELS BUILDING.

	Great Britain.	France.	Russia.	Germany.	Italy.	United States.	Japan.
Battleships	12	8	6	5	2	8	3
Cruisers, armoured	8	10	1	2	2	—	6
„ protected	24	10	3	8	3	1	6
„ unprotected	—	—	—	—	—	—	1
Coast-defence vessels, armoured .	—	—	1	—	—	—	—
Special vessels	—	—	—	—	—	—	—
Torpedo vessels	—	2	—	—	—	—	—
Torpedo-boat destroyers . . .	46	8	28	1	1	20	8
Torpedo-boats	—	38	—	9	2	22	12

Dimensions.

The full superiority of the British Navy is not fully shown in a comparison of numbers without reference to dimensions. Dealing with the growth in dimensions, Sir William White remarks, that while the ships laid down from 1880 to 1885 were on the average below 11,000 tons, in 1885 the tonnage rose to the 11,940 tons of the Nile and Trafalgar, and the 14,150 tons of the Royal Sovereign, advancing in 1894 to the 14,900 tons of the Majestic class, and the 15,000 tons of the Formidable type now building. We have on the British Navy list, 24 ships of over 14,000 tons, all but two being battle-ships. The list includes eight Royal Sovereigns, nine Majestics, six Formidables, and two cruisers, the Powerful and Terrible. Between 12,000 and 13,000 tons we have eleven ships, seven being battleships and four cruisers. Between 10,000 and 12,000 tons we have ten ships, two being battleships. Of cruisers we have seventeen, ranging from 6500 to 9100 tons; twenty-four, ranging from 4000 to 5800 tons; and forty-six ships between 2000 and 4000 tons. If we look to the French list, taking ships of even date with the British vessels included in the above analysis, we find eleven ships with a tonnage of 11,000 tons and over, the largest ship only slightly exceeding 12,000 tons. Russia has nine ships of 11,000 tons and over, the largest ship having a displacement of 12,540 tons. In their average tonnage our cruisers show a superiority yet more conspicuous than that of the battleships.

Sir William White calls attention to the great advantage of the British over any foreign Navy, resulting from the homogeneity of our squadrons. The battleships recently built and now building have been repetitions of four designs carefully worked out in every detail. The same policy is represented in the cruisers. We have eight ships of the Diadem class, 11,000 tons; nine of the Edgar class, of 7350 tons; twelve of the Talbot class, 5600 tons; eight of the Astræa class, 4360 tons; and twenty-one of the Apollo class, 3400 tons.

Ships in commission.

If we compare the fleets in commission under British and French flags it will be seen from the lists printed in Chapter III. that, both in the Channel and Mediterranean, in battleships the British fleet has an overwhelming superiority. In cruisers we far outnumber the ships under the French and Russian flags. On foreign stations, while France has not been so weak for many years past as at the present time, the British squadrons have never been so strong The British Navy has no inadequate strength in battleships and cruisers, nor is it wanting in the skilled administration of such men as Earl Spencer, Mr. Goschen, Sir Anthony Hoskins, Sir Frederick Richards, nor above all, in the numbers and the quality of the officers and the seamen to whom our fleets would be entrusted. It

is not open to question that the British Navy has never, at least since the great war, been so efficient as it is to-day for the duties for which it is maintained. Those duties have been clearly set forth by Sir George Clarke, in his recent volume on 'Imperial Defence.' The duty of the Navy is to protect the maritime communications of the Empire, first, by meeting the enemy's fleet in home waters, second, by preventing raids on its commerce afloat.

Opinions of M. Clémenceau and General Shafter.

An important opinion of the relative strength of the French Navy has recently been published in the *North American Review*, by M. George Clémenceau. In the opinion of the leader of advanced politics in the French Assembly, England is now the arbiter of all contests upon the sea. The scales, in his belief, are certain to deflect on the side to which she will bring the strength of her fleet, her manufacturing resources, and her credit. Deprecating the vain attempt to meet British fleets in the line of battle, and quoting the views long entertained by the most distinguished officers of the French Navy, the writer strongly advocates the interruption of British commerce as the proper objective of French Naval policy. It is perhaps unnecessary to point out that the interruption of commerce with the United Kingdom would inflict a grave injury on other powers, and especially on the United States, which would not be tamely accepted. Those who furnish our supplies are as deeply interested in keeping trade routes open as we ourselves are. Still less is it necessary to remark that attacks on trade would be met by reprisals, the first result to an enemy being the loss of his transmarine possessions. The opinion of M. Clémenceau has been reiterated by General Shafter, lately in command in Cuba. He believed that "in a war between France and the United Kingdom, the fleet of the former country would disappear from the seas in less than a fortnight."

Resources of Empire.

Looking beyond the armed strength at sea to the broader foundations on which naval and military power depend, the financial resources of the British Empire are practically inexhaustible. The mother country, unaided by contributions from any of the outlying parts of the Empire, is able, without effort, to raise a revenue of £106,000,000. Such is the amplitude of our resources, that our taxation is, as Mr. Senior has remarked, at once the heaviest and the lightest in Europe, the heaviest if we regard the amount raised, the lightest if we regard the ability to bear it. To protect our vast trade and communications across the ocean, we bear the weight of an enormous warlike expenditure. France spends on her army and navy £36,387,000, Germany £35,226,000, Russia £38,569,000, Great Britain £42,997,000. The populations under the British flag which we have undertaken to defend are three times those of France,

Germany, and Russia combined. We spend less on defence per square mile than any other of the great powers.

If we turn to Russia, it is clearly seen that there is no disposition to enter into distant conflicts upon issues in which the interests of the Empire are not concerned. Russia has much to accomplish in the advancement of the material and social welfare of the people, and in the working out of political reforms urgently demanded through the spread of education among the professional classes. At the present time Russia wants peace. The rescript of the Czar may be taken to represent the line of policy best adapted to the present state of affairs in the unwieldy Empire over which he rules. If we ask ourselves why Russia should necessarily be regarded as a power hostile to British interests, it is not easy to supply an answer. As Sir George Clarke has justly observed in his recent essay, Russia has not occupied a square yard of territory which is now or ever has been desired by Great Britain. Russia.

Among the changes which are taking place on the continent of Europe, it is evident that the Triple Alliance has of late been falling to pieces. Austria is torn asunder by the conflict of races, Italy is being exhausted by oppressive taxation. Meanwhile, the British Empire is being consolidated as it has never been before. At no former period has the sentiment of loyalty to the throne, as the symbol of the unity of a great people, been so firmly rooted in the hearts and affections of every British subject. To quote from a writer in the *Melbourne Argus*, the tie which binds the Colonies to Great Britain is light as gossamer but stronger than steel. It is the blood tie. Triple Alliance.

Turning to another quarter of the globe, to our relations with our kith and kin in America, the present writer regards with the most profound satisfaction the ample fulfilment of the hopes to which expression was given in his last contribution to the *Naval Annual.* By a spontaneous sentiment strongly felt on both sides of the Atlantic, and by the unanimous voice of the two great branches of English-speaking peoples, a better understanding has now been established than has ever before prevailed since the links which bound them together were severed. Slowly perhaps, yet surely, the drift of the future will be towards united action in the cause of political and commercial freedom. The union, which to men of the departing generation may only be a dream, will doubtless be the proud achievement of the statesmen of the United States and of Greater Britain in the next generation of men. United States.

In measuring the relative strength of the British Empire, a wide sweep must be taken. We must look not only to naval and military

preparations and to the resources on which they depend, but above all to the distinctive features of national character. In the great quality of self-help the Anglo-Saxon stands pre-eminent. France, as the Edinburgh reviewer justly remarks, is being ruined by thrift and prudence carried to excess, by the fear that children may die of starvation. The Anglo-Saxon is winning in the race by his courage in maintaining the struggle for life. He is winning, as Professor Jebb has well said, by dint of his dogged resolve to maintain law and order and to see justice done wherever he undertakes to govern. He is winning by his tenacity of purpose, and by facing risks and responsibilities from which weaker races recoil. The strength of the British Empire has been attested with convincing force by events of recent occurrence. The Fashoda incident has shown to all the world that when Great Britain makes a firm stand in a just cause she has nothing to fear.

BRASSEY.

CHAPTER I.

PROGRESS OF THE BRITISH NAVY.*

THE efforts made for the past ten years by successive administrations to place the Navy in a condition to protect the great interests involved have not been without practical result during the year under review. "For the first time in my memory," said Admiral Sir Nowell Salmon at the City banquet to Lord Kitchener, "the nation has been brought face to face with the prospect of a war without suffering from a war scare. This, I have no hesitation in saying, the nation owes to the able administrators whom we have at our back."

Although no battleships have been completed during the year under review, no less than sixteen are under construction or projected, including six of the Canopus class, six of the Formidable class, and four new ships not yet laid down. The policy of Lord Spencer's Board was to press rapidly forward a moderate number of ships. At present, partly owing to the delays caused by the engineers' strike, we have an unusually large number of ships in hand, in various stages of construction. The following table, taken from *Engineering*, gives a comparison of the main features of the ships above referred to, with those of the Majestic class:— Battle-ships.

—	MAJESTIC (1895)	CANOPUS (1897)	FORMIDABLE (1898)	DUNCAN (1899)
Number included	9	6	6	4
Length between perpendiculars	390 ft.	390 ft.	400 ft.	405 ft.
Breadth	75 ft.	74 ft.	75 ft.	75 ft. 6 in.
Draught (mean)	27 ft. 6 in.	26 ft.	26 ft. 9 in.	26 ft. 6 in.
Displacement	14,900 tons	12,950 tons	15,000 tons	14,000 tons
Speed in knots	17·5	18½	18	19
Indicated horse-power—				
Natural draught	10,418	13,500	15,000	18,000
Forced draught	12,497	...	...	...
Working pressure	155 lb.	300 lb. to 250 lb.	300 lb. to 250 lb.	300 lb. to 250 lb.
Boilers—number and type	8 S. E. cylindrical	20 Belleville	20 Belleville	24 Belleville
Weight of machinery	1300 tons	1290 tons	1400 tons	1580 tons
Armament	4 12-in. 12 6-in. Q. F. 18 12-pdrs. 20 smaller 5 tubes, 4 sub.	4 12-in. 12 6-in. Q. F. 10 12-pdrs. 18 smaller 4 tubes sub.	4 12-in. 12 6-in. Q. F. 18 12-pdrs. 20 smaller 2 tubes sub.	4 12-in. 12 6-in Q. F. 12 12-pdrs. and smaller 4 tubes sub.
Armour	Belt, 9 in. Bulkhead, 14 in. to 9 in. Barbette, 14 in. to 6 in. Casemates, 6 in. Deck, 4 in. to 2½ in.	6 in. 12 in. 12 in. to 5 in. 6 in. 3 in. to 2 in.	9 in. 12 in. to 9 in. 12 in. to 6 in. 6 in. ...	7 in. to 4 in. 11 in. to 10 in. 11 in. 6 in. ...
Coal Supply, normal	900	800	900	900
" bunkers full	1850	1850	2000	2000
Cost	£910,000	£835,000	£930,000	...

* Instead of the ordinary arrangement of this Chapter under the headings "Ships Completed," "Ships Launched," and "Ships Laid Down," we think it preferable, for purposes of reference, to deal with all battleships, cruisers, and torpedo craft under these heads.

In many respects these ships closely resemble one another. The later ships are slightly longer, draw less water (a great advantage), and they are considerably faster than the Majestic. Nineteen knots, with natural draught, is an almost unprecedented speed for a battleship, and approaches that of many cruisers. There is a larger area of side protected in the new ships, and the armour treated by the new process has greater powers of resistance. The armament is practically the same, but the guns of the new ships have greater penetration.

Battle-ships launched —Canopus class.

The Canopus, laid down on January 4th, 1897, was launched at Portsmouth on October 13th, 1897, and is nearly ready for her trials. The Goliath, laid down at the same time as the Canopus, was launched at Chatham on March 23rd, 1898. The Albion was launched at Blackwall on the 21st June; the Ocean at Devonport on the 5th July, 1898. The Glory is building in dock at Messrs. Laird's, Birkenhead. The Canopus and Ocean will probably be completed in June, the three others before March 31st, 1900. The Vengeance, which was commenced much later than the rest at Barrow, will not be delivered till July, 1900. It is unnecessary to repeat here descriptions of the Canopus class.

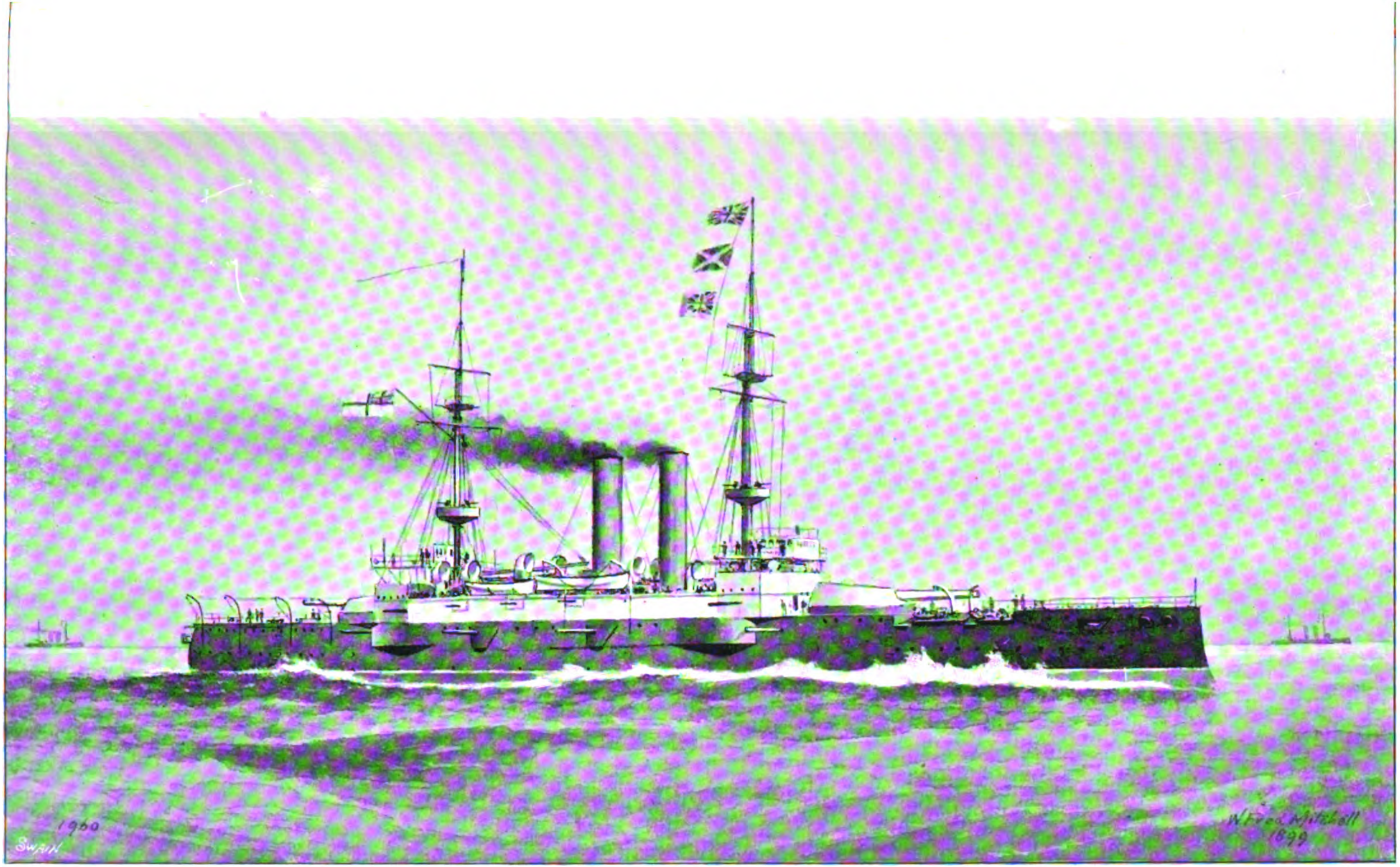
Formidable class.

The Formidable, laid down at Portsmouth on March 17th, 1898, was launched on November 17th; the Irresistible, laid down at Chatham on April 11th, 1898, was launched on December 15th, the former displacing 4500 tons, and the latter 5000 tons. The Implacable, laid down on July 15th, 1898, was launched at Devonport in March, 1899. These three ships were launched in a very incomplete state, in order to make room on the slips for the London, Venerable, and Bulwark.

The Formidable class * may be described as improved Majestics. On a less draught they carry a greater store of coal, and though there is no difference in the weight or distribution of armament, many improvements in rapidity of fire will be introduced.

The following description is taken mainly from the *Times*: "The Formidable will be propelled by twin screws, each screw being actuated by a set of triple expansion engines of 7500 I.H.P. Steam will be supplied by twenty Belleville water-tube boilers, capable of standing a pressure of 300 lb. to the square inch, but the pressure will be reduced at the engines to 250 lb. The engines and boilers are being built by Messrs. Earle, of Hull. At the prescribed draught the ship will carry only 900 tons of coal, but a special feature of this type of vessel is that the lower bunkers can be coaled independently of the upper bunkers. The bow, as in the case of the Canopus

* *Cf.* Plate 8, kindly supplied by the Admiralty.



"CANOPUS,"

BRITISH BATTLESHIP.

and the ram cruisers, is protected by 2-in. plating from the citadel to the stem. The side armour, which is treated by the improved Harveyed process, will be 9 ins. in thickness, 15 ft. in depth, and 216 ft. in length, thus providing a belt for 54 per cent. of the ship's side. The armour bulkheads, varying in thickness from 9 ins. to 12 ins., join the ends of the side armour, forming a complete belt round the vital parts of the ship. There are two protective decks, the upper one being of the turtle-back shape, on which the armour rests, and formed of 2-in. plating on the flat portion, increasing to 3 ins. on the slopes and at the after end. The main armament consists of four 12-in. breechloading wire guns of a new and improved type mounted in pairs, two forward and two aft. They will be protected by an 8-in. shield or gunhouse, and the hydraulic machinery for working the guns by a 12-in. circular armoured redoubt. The auxiliary armament consists of twelve of the new Vickers 6-in. Q.-F. guns mounted in casemates, eight on the main deck and four on the upper deck. Four of these can be fired right forward and four right aft. Eight of the 12-pr. Q.-F. guns will be carried on the main deck, and the other eight on the upper deck, the 3-prs. being carried in the fighting tops. There will be four 18-in. submerged torpedo tubes, two forward and two aft. If employed as a flagship the Formidable will have a complement of 789 officers and men. She will be fitted with two steel masts, each with a military or fighting-top, and with a searchlight platform on the main topmast."

Battleships laid down.

The London was laid down at Portsmouth on December 7th; the Venerable at Chatham on January 2nd, 1899 (making the third battleship which has occupied the same slips during the year); the Bulwark at Devonport in March, 1899. The dimensions, armament, and speed of these ships will be the same as those of the Formidable, but, says the *Times*, "whereas the Formidable has a plating two inches thick from the ram to the citadel, the belt of the London (and her sisters) will be continuous, tapering off to a thickness of two inches at the ram."

Duncan class.

The orders for the four battleships of the supplemental programme, which was introduced in consequence of the large additions that Russia and France, especially the former, proposed to make to their navies subsequently to the presentation of the British Navy Estimates, and was sanctioned by Parliament on July 22nd, 1898, have been allotted as follows: Two to the Thames Ironworks, one to Messrs. Laird, and one to the Palmer Shipbuilding Co., of Jarrow. The chief feature of these new battleships, which are to be known as the Duncan class, is their high speed. The belt armour will be 7 ins. thick over a considerable portion of the length, but continued as in the later Formidables in gradually reduced thickness to the bow.

First-class cruisers.

The large cruisers Powerful and Terrible were practically completed in time for the Jubilee Review of 1897; but so much trouble was subsequently experienced with their machinery (not the boilers, which were regarded as the great experiment) that they can only now be said to be really fit for service.

Terrible.

The results of the continued trials of the Terrible, which took place in 1898, were thus tabulated in *Engineering*:—

PRINCIPAL RESULTS OF TRIALS OF H.M.S. TERRIBLE.

Date of trial	May 4–7, 1898	June 25–27, 1898	Aug. 13–16, 1898	Aug. 29–31, 1898	Sept. 13, 1898	Sept. 14, 1898
Where trial took place	Channel	Passage to Gibraltar	Channel and Atlantic Ocean		Channel	Channel
Duration of trial	60 hours	60 hours	60 hours	60 hours	8 hours	4 hours
Draught of water { Forward	27 ft. 9 in.	28 ft. 2 in.	26 ft. 7 in.	27 ft. 5 in.	27 ft. 6 in.	26 ft. 10 in.
Draught of water { Aft	29 ,, 5 ,,	29 ,, 5 ,,	29 ,, 4 ,,	29 ,, 6 ,,	29 ,, 6 ,,	29 ,, 5 ,,
Steam in boilers . . . lb.	217	230	222	233	240	240
Vacuum in condensers . . . in.	26¾	26½	26	25½	25	25
Revolutions by counter	64	81·26	93·66	98·38	104·2	108·6
Average indicated horse-power	5084	10,246	15,554	18,515	23,050	25,115
Total distance run . . . sea miles	758·4	1,020	1,176	1,218	...	...
Average speed . . . knots	12·64	17	19·6	{ 1st 30 hrs. = 20·1 2nd 30 hrs. = 20·5 }	20·7*	22
Total consumption of coal during trial for all purposes . . . tons	313·2	519	819·4	1081	...	...
Consumption per indicated horse-power per hour for all purposes lb.	2·3	1·89	1·96	2·17	2·14	2·11
Description and quality of coal	Welsh, good but small	Welsh, good	Welsh, 6 to 7	Welsh, 5 to 6, small and of fair quality	Welsh, small	Welsh, small
State of sea	Slight	Smooth	Slight	Moderate to swell	Smooth	Smooth
Wind, force	2 to 5	1 to 2	...	{ 5 to 6 1st 30 3 ,, 2 2nd 30 }	1 to 2	1 to 2

* Logs incorrect, jumping out of water.

The four hours' trial at 25,000 horse-power was interfered with by fog, which rendered a continuous four hours' run impracticable. The mean results of the morning and afternoon runs were therefore combined. In addition to the above trials, the Terrible made a voyage to Gibraltar and back, with Mr. Goschen on board, in May–June, 1898. The outward passage was accomplished in 68 hours, with a mean I.H.P. of 10,246 and 81·26 revolutions, giving an average speed of 17 knots. The coal consumption worked out at 1·89 lb. per unit of power, which was regarded as satisfactory. On the homeward passage it was decided to steam at 17,000 horse-power, at which the vibration produced at 15,000 horse-power practically vanished. This power had been maintained for three hours, running at 20 knots, when the high-pressure cylinder gave renewed indications of a defect. The voyage was therefore completed at 7000 I.H.P., which gave a speed of 15 knots. On November 27th, at 11 A.M., the Terrible sailed from Portsmouth for Malta. Maintaining an average speed of 18 knots, at 12,500 horse-power, she passed Gibraltar at 6 A.M. on November 30th. Between Gibraltar and Malta, a speed of 21½ knots

had been maintained for eighteen hours, when, owing to a hot bearing, it was reduced; but the ship continued under one screw at 14 knots. By the evening she was proceeding at nearly 22 knots, which was maintained until she reached Malta the next day. In spite of the delay, arising from the hot bearing, and a rough sea encountered in the Bay of Biscay, which caused a roll of 26 degrees, the passage was thus a remarkable one.*

Powerful. The Powerful, whose passage to China last year was attended with so many engine-room troubles, has attained results nearly as satisfactory as those of her sister ship, considering the latter had all the advantage of having her defects remedied in a Home Dockyard. The Powerful left Wei-hai-wei on July 27th, and arrived at Yokohama on the 30th, having done a sixteen hours' trial at 15,000 horse-power, and an eight hours' trial at 19,000 horse-power. During the passage she steamed 20·7 knots for eight hours, 19 knots for thirteen-and-a-half hours, while for the three days' steaming the average speed was 17½ knots. Eight stokers are reported to have refused to do duty *en route*. On a later voyage from Yokohama to Hong Kong, the Powerful averaged 20½ knots for the twenty-four hours' trial, consuming 540 tons of coal.*

The Engineering Department of the Admiralty are certainly to be congratulated on having at last succeeded in making the Powerful and Terrible fairly effective ships. Their original cost was rather under £700,000 apiece. What they have cost the country now in trials, alterations, and repairs, and in docks specially enlarged to accommodate them, will never be known.

Diadem class. All the four first-class cruisers of 11,000 tons laid down in 1895-96 have been completed. The results of the trials of the Diadem were given last year, but are included, for the sake of comparison, in the following table. The Andromeda was built at Pembroke, and engined by Messrs. Hawthorn Leslie. The Europa was built at Clydebank, the Niobe, by Messrs. Vickers, at Barrow, and the Argonaut, by the Fairfield Company, at Glasgow, the engines being supplied by the builders of the ship in each case. The Argonaut and Ariadne, the latter built at Clydebank, are improved Diadems, and were designed to give 18,000 I.H.P. and 20¾ knots speed, as compared with 16,500 I.H.P. and 20½ knots in the case of the Diadem. "That three of these ships should have consumed 1·6 lb. of coal or less per I.H.P. per hour in their 12,500 I.H.P. trials, proves," as *Engineering* remarks, "that the improved Belleville boiler is not lacking in economy." † It should be

* Particulars of these passages from *Naval and Military Record*.
† Cf. Chap. X.

borne in mind that most of the trials which took place in the summer were made with inferior coal, owing to the Welsh strike.

EIGHT HOURS' FULL POWER TRIALS.

—	Mean Draught.	Total I.H.P.	Mean Revolutions.	Steam in Boilers.	Speed.
	ft. in.			lbs.	knots.
Andromeda	25·3	16,751	117·2	285	20·41
Europa	...	17,137	113	279	20·4
Niobe.	...	16,834	117·5	263	20·5
Diadem	25·4	17,262	119·1	291	20·65
Argonaut	...	18,894	...	...	21·17
Ariadne	25·3	19,156	118·9	288	21·5

THIRTY HOURS' COAL CONSUMPTION TRIALS.

—	Mean Draught.	Total I.H.P.	Mean Revolutions.	Steam in Boilers.	Speed.	Coal per I.H.P. per Hour.
	ft. in.			lbs.	knots.	lbs.
Andromeda, at 3,300 H.P. .	25·4	3,388	69·26	197	12·9	1·98
" " 12,500 " * .	...	12,621	107·1	266	19·3	1·74
Europa " 3,300 " .	...	3,302	65·4	212	12·7	2·24
" " 12,500 " .	25·6	12,739	103·8	265	19·33	1·94 †
Niobe " 3,300 " .	25·3	3,341	70·1	200	12·3	1·77
" " 12,500 " .	...	12,961	107·5	258	19·27	1·55
Diadem " 3,300 " .	25·4	3,318	...	...	12·64	2·21
" " 12,500 " .	25·4	12,776	107·6	280	19·79	1·61
Argonaut " 3,600 " .	...	3,756	...	...	13·15	2·13
" " 13,500 " .	...	13,815	...	...	19·86	1·6
Ariadne " 3,600 " .	25·9	3,758	70·3	218	13·3	2·05
" " 13,500 " .	25·4	14,046	109·1	262	20·1	1·73

* Heavy sea running. † Probably includes consumption for auxiliary engines.

In addition to the trials mentioned above, the Europa steamed for four hours at full power, with 24 boilers (80 per cent of total), the results showing 16,298 I.H.P., 110·3 mean revolutions, and a speed of 20·9 knots, with an air pressure of 45 ins. and a coal consumption of 1·91 lb. per I.H.P. per hour. As pointed out in *Engineering*, this may be regarded as very favourable, indicating as it does that the ships of this class have that reserve of boiler power for full speed which does not characterise all the ships of the Navy, and that two or three of the boilers may be placed *hors de combat* without affecting the speed of the ship. The Niobe has had serious troubles with her machinery since she was commissioned for service in the Channel Squadron, and has been ordered to go through another series of trials.

The Diadem, on the other hand, has run from Gibraltar to the Nore in 69 hours at a speed of 19·27 knots, with 14,268 I.H.P., or 86·4 per cent. of her maximum power—a highly satisfactory performance.

The two remaining vessels of this class have been launched; the Amphitrite, at Barrow, on July 7th, 1898; and the Spartiate, at Pembroke, on November 27th.

The Diadem class are a valuable addition to the British Navy. They are fine-looking ships, and should be well able to maintain their speed in a sea-way. Their speed, 20½ to 21 knots on trial, is good, and their armament of sixteen 6-in. Q.-F. guns is powerful, fairly well distributed, and in most cases well protected. The fact that they carry no side armour is a weakness, which is being remedied in the Cressy class.

The following table gives the particulars of the Cressy class and the new cruisers, as compared with those of the Diadem and the Powerful:—

Class.	Diadem.	Cressy.	Powerful.	Drake Class.	New.
Number	8	6	2	4	2
Length between perpendiculars	435 ft.	440 ft. 0 in.	500 ft.	500 ft.	440 ft.
Breadth	69 „	69 „ 6 „	71 „	71 ft. (extreme)	66 ft.
Draught	25 ft. 6 in.	26 „ 3 „	29 „	26 ft.	24 ft. 6 in.
Displacement	11,070 tons	12,000 tons.	14,200 tons	14,100 tons	9800 tons
Speed in knots	20·75	21	22	23	23
Indicated horse-power	18,000	21,000	25,000	30,000	22,000
Working pressure	300 lb. to 250 lb.	300 to 250	260 to 210	300 to 250	..
Boilers, number and type	30 Belleville	30 Belleville	48 Belleville	48 Belleville	..
Weight of machinery	1630 tons	1800 tons	2258 tons	2500 tons	..
Armament	16 6-in. Q. F. 14 12-pdrs. 3 3-pdrs.	2 9·2-in. 12 6-in. Q. F. 17 smaller	2 9·2-in. 12 6-in. Q. F. 30 smaller	2 9·2-in. 16 6-in. Q. F. 14 12-pdrs. 3 3 „	.. 14 6-in. Q. F. 10 12-pdrs. 3 3-pdrs.
Torpedo tubes	2 sub.	2 sub.	4 sub.	2 sub.	2 sub.
Armour—Belt	Nil.	6 in.	6 in.	6 in.	4 in.
Gun Position	6 in.	6 in.	6 in.	6 in.	4 in.
Deck	2–4 in.	2–3 in.	3–6 in.	2–4 in.	?
Coal Supply, normal	1000	800	1500	1250	800
„ bunkers full.	1900	1500?	3000	2500	1600

The Aboukir and Cressy were laid down at Fairfield, the Hogue at Barrow, and the Sutlej at Clydebank, in 1897–8. The Bacchante has been laid down at Clydebank, and the Euryalus at Barrow, during the present year. The following description of the Cressy class* is condensed from the *Naval and Military Record*:— Cressy class.

"The difference in displacement between the new cruisers and the Diadem is due to the extra armour carried. The total will amount to 1200 tons. The Diadem has all her guns as effectively protected with nickel steel as the Cressy class, and as the hull of the Cressy class will weigh 7860 tons, or 835 tons more than that of the Diadem, the additional weight may be regarded as entirely due to

* *Cf.* Plate kindly supplied by the Admiralty.

the armour. The broadside armour will consist of a belt 11 ft. 6 in. deep, extending 5 ft. below the water-line and 6 ft. 6 in. above it. This armour, which is to be 6 ins. thick, will extend for a length of 230 ft., terminating 120 ft. from the bow and 90 ft. from the stern in thwartship bulkheads 5 ins. thick.

"The main armament will resemble that of the Powerful rather than that of the Diadem. The latter has two 6-in. Q.-F. guns on the forecastle, with shields, and two of the same calibre on the upper deck, aft. The Cressy class will have instead one 9·2-in. 22-ton gun firing ahead and one firing astern, mounted in barbettes with 6-in. armour. The 6-in. guns are distributed as in the Powerful. Four are fitted in casemates to fire ahead in line with the keel, and four to fire astern, and these also can fire on the broadside at almost any angle. There are also to be four amidships on the main deck, two on either side. There are in addition to be distributed throughout the ship twelve 12-pounders and a number of machine-guns. In the Cressy class the four boiler compartments will take up 130 ft. of the length of the ship as against 132 ft. in the Diadem and 186 ft. in the Powerful, but there is not much difference in the size of the engine-rooms. The coal-bunkers are to be arranged on either side of the boiler-rooms under and over the protective deck, and, as in all ships now built, an ammunition passage is to be arranged immediately under the protective deck. There is to be a thwartship bunker right forward. There will be 30 boilers of the Belleville type fitted with economisers, as in all later ships. The working pressure will be 300 lb. per square in., reduced to 250 lb. at the engines. With 21,000 I.H.P. and 120 revolutions the speed of the new cruisers is to be 21 knots, which should easily be realised. The vessels will have four funnels and two masts, with a top on each for carrying search lights (but no guns), and with the usual semaphores."

Drake class. The four cruisers of the Drake class, of which one has been ordered from Messrs. Vickers, Son, and Maxim, of Barrow, one from the Fairfield Company, and one from Messrs. Thomson, of Clydebank, the builders in each case supplying the machinery, while the fourth is to be built at Pembroke, the machinery being supplied by Messrs. Humphry, Tennant, and Co., were thus described by Mr. Goschen in his statement of July 22nd, 1898:—"They will be superior in speed and armament to the Cressy class and of larger dimensions. The protection to the 9·2-in. and 6-in. Q.-F. guns will be equal to that of the Powerful class. The guns will be of the more modern type adopted for the Cressy class, and of considerably greater power than those of any other cruiser. There

will be four more 6-in. guns than in the Cressy. Buoyancy and stability will be protected by vertical side armour about 6-in. thick, associated with strong steel decks. In these features the arrangements will be similar to those of the Cressy class and the Canopus class, but the bows will be more strongly defended. The steel hulls will be unsheathed. The measured-mile speed on an eight hours' trial with natural draught will be 23 knots. The continuous sea speed with smooth water will be 21 knots. Water-tube boilers will be adopted and twin-screws. The capacity of the coal bunkers will be 2500 tons, and 1250 tons will be carried at the speed trials."

The First Lord gives in his Memorandum the following further information regarding the new cruisers of 9800 tons, of which the principal features are given in the tables. Four of the 6-inch guns will be mounted in turrets and ten in casemates. The 6-in. guns will be of the latest type, and will be protected by armour about four inches thick. Vertical side armour of the same thickness will be carried over a considerable portion of the length, with thinner armour on the bows. Strong protective decks will be associated with this side armour. The steel hulls will be unsheathed. **New type.**

Belleville boilers, with economisers, will be fitted. The speed of 23 knots is to be maintained for eight hours on contractors' trials. For smooth water continuous steaming at sea about 21 knots should be maintained. The coal-bunker capacity will be for 1600 tons, and 800 tons are to be carried on the speed trials.

The following are particulars of the trials of the second-class ram cruisers of the Arrogant class: Displacement, 5800 tons; I.H.P., 10,000; speed, 19·25 knots. **Second-class cruisers.**

NATURAL DRAUGHT TRIALS.

—	Mean Draught.	I.H.P.	Mean Revolutions.	Speed.
Furious	...	7133	...	18·7 kts.
Gladiator	21 ft.	7149	123·9	17·5 kts.
Vindictive . . .	20 ft. 10 in.	7164	125·4	17·7 kts.

FULL-POWER TRIALS.

—	Mean Draught.	I.H.P.	Mean Revolutions.	Speed.
Furious	...	10,272	140·8	20·1 kts.
Gladiator * . . .	21 ft.	10,088	137·4	19·1 kts.
Vindictive † . . .	20 ft. 1 in.	10,263	138·9	20·1 kts.

* Bottom foul. † Heavy wind and rough sea.

30 HOURS' COAL CONSUMPTION TRIALS.

—	Mean Draught.	I.H.P.	Speed.	Coal per I.H.P. per hour.
Furious	...	2269	13·6 kts.	2·34 lbs.
Gladiator	21 ft.	2164	12·8 kts.	2·16 lbs.
Vindictive . . .	21 ft. 1 in.	2153	12·6 kts.	2·16 lbs.

The Arrogant was completed in 1897–8; both she and the Furious are now in commission in the Channel Squadron. The fact that the Gladiator, which was laid down in January, 1896, and launched in September of the same year, has been over three years under construction, is thus explained by a Dockyard correspondent of the *Naval and Military Record*:—"In a Government yard it is impossible at a moment's notice to discharge hundreds of men because at a particular moment they are not wanted; nor is it practicable to hold out a signalling flag to show when you do want them. It is, therefore, desirable to have what may be roughly described as a stand-by ship. When there is a plethora of hands, the surplus goes to the Gladiator; when hands are wanted elsewhere they leave the Gladiator." This vessel will be completed in April, 1899.

Hermes class. The three second-class cruisers of the Hermes class have been launched, the Hermes at Fairfield on the 4th April, 1898; the Highflyer also at Fairfield, on the 4th June; the Hyacinth, by the London and Glasgow Shipbuilding Company, on the 27th October. These cruisers are of the same type as the Eclipse. Length between perpendiculars, 350 feet; beam, 54 feet; displacement, 5600 tons. The hull is of Siemens-Martin steel, sheathed with teak and coppered. The main armament consists of eleven 6-in. guns, as compared with five 6-in. and six 4·7-in. guns in the Eclipse—and only four 6-in. and six 4·7-in. guns in the Arrogant, both of which vessels, as we have often pointed out, were lamentably under-armed. It is satisfactory to note the improvement in this respect in the Hermes and her sisters. These vessels are fitted with 18 Belleville boilers and economisers. The estimated speed is 20 knots.

Third-class cruisers. Of the ten third-class cruisers of the Pelorus type, of 2135 tons displacement, which were in hand at the beginning of 1898, the Proserpine, Pactolus, and Pegasus are in commission; the Psyche was launched at Devonport on the 19th July; the Prometheus, from Messrs. Earle's yard at Hull, on the 19th October; the Pyramus is building at Palmer's; the Pandora, Pioneer, and Pomone at Portsmouth, Chatham, and Sheerness respectively. The Psyche, Pomone, Perseus, and Prometheus will be completed early in the financial

year. The following are the results of the trials of those completed. The estimated speed is 18·5 knots, with 5000 I.H.P., under natural draught, and 20 knots, with 7000 I.H.P., under forced draught.

EIGHT HOURS' NATURAL DRAUGHT TRIALS.

—	Mean Draught.	Total I.H.P.	Mean Revolutions.	Speed.
Pactolus	13 ft. 3 in.	5428	197·7	19·1
Pegasus	13 ft.	5400	203·25	20
Perseus	...	5238	195·8	19·1
Proserpine . . .	13 ft. 4 in.	5354	194·25	19·7
Pomone	...	5540	201	20·2
Psyche	...	5095	193·55	19·3

FOUR HOURS' FORCED DRAUGHT TRIALS.

—	Mean Draught.	Total I.H.P.	Mean Revolutions.	Speed.
Pactolus	13 ft. 8½ in.	7201	213·8	20·5*
Pegasus	12 ft. 7 in.	7134	217·7	21·2*
Proserpine . . .	...	7145	...	21
Pomone	...	7340	220·6	20·8

* The Pactolus is fitted with Blechynden, the Pegasus with Reed's, boilers.

THIRTY HOURS' COAL CONSUMPTION TRIALS.

—	Mean Draught.	Total I.H.P.	Mean Revolutions.	Speed.	Coal per I.H.P. per hour.
Pactolus	13 ft. 5½ in.	3631	171·62	16.6	2·46 lbs.
Pegasus	13 ft. 7½ in.	3698	176·4	17·26	1·96 lbs.
Perseus	...	3627	...	17·2	2·1 lbs.
Proserpine . . .	13 ft. 7½ in.	3615	168·75	17	2·16 lbs.
Pomone	...	3604	...	16·5	2·45 lbs.
Psyche	...	3637	170·75	16·8	2·3 lbs.

No less than six sloops and four gunboats are in course of construction, the latter for river service.

The Condor and Rosario, laid down on January 1st, 1898, were floated out of dock at Sheerness on December 17th. The Shearwater and the Vestal have been laid down at Sheerness, the Mutine and Rinaldo at Birkenhead. Their dimensions are: Length, 180 ft.; beam 32 ft. 6 in.; mean load draught, 12 ft.; displacement, 980 tons. These vessels will be fitted with water-tube boilers capable of driving the engines at 1100 I.H.P. with natural draught, and at 1400 I.H.P. with forced draught, the corresponding speeds being 12·6 and 13·25 knots. The armament will consist of six 4-in. and four 2-pr. Q.-F. Sloops.

guns, and four Maxim machine-guns. They will be rigged with two masts, on each of which, at a height of about 20 ft. from the deck, platforms will be fitted for the mounting of machine-guns, so that with their light draught they will prove invaluable for river duty.

Gunboats.

Of the four first-class gunboats laid down in the latter part of 1897, the Britomart is building at Messrs. Potter's, Queen's Dock, Liverpool, and the Dwarf and Thistle at the works of the Glasgow Shipbuilding and Engineering Co., Govan. The dimensions are: Length between perpendiculars, 180 feet; beam, 33 feet; displacement, 700 tons at a load draught of 8 feet; horse-power, 1300; estimated speed, 13·5 knots. The armament comprises two 4-in. and four 12-pr. Q.-F. guns, and six ·45-in. Maxims. The Bramble, the other new gunboat of the Thistle class above referred to, was launched on the 24th November at Messrs. Potter's yard. Her armament will be similar to that of the Dwarf, except that she will carry only two 12-prs., but ten instead of six ·45-in. Maxims, three on each side of the vessel on the main deck, and two in each of the two military fighting-tops.

Torpedo-boat destroyers.

The following table giving the official results of completed trials of destroyers during 1898 is taken from *Engineering* :—

Firm.	Ship.	Indicated horse-power.	Speed.	Coal.
			knots.	
Laird Brothers	Locust	6,848	30·159	2·43
	"	6,401	30·107	..
	Seal	7,090	30·022	2·53
	"	6,322	30·117	..
	Wolf	6,765	30·111	2·27
	"	6,146	30·265	..
Fairfield Company	Gipsy	6,058	30·057	2·47
	"	6,496	30·207	..
	Fairy	6,819	30·091	2·5
	"	6,659	30·201	..
	Osprey	6,267	30·318	..
Doxford, Sunderland	Violet	6,531	29·839	2·468
	"	6,640	30·16	..
	Sylvia	6,371	29·788	2·53
	"	6,557	30·077	..
Thornycroft	Angler	5,892	30·409	2·347
	"	5,835	30·372	..
	Ariel	6,069	30·039	2·018
	"	6,090	30·594	..
Palmer, Jarrow-on-Tyne	Flying Fish	6,496	30·484	2·29
	"	6,503	30·378	..
	Fawn	6,452	30·267	2·35
	"	6,605	30·462	..
	Flirt	6,468	30·009	2·8
White, Cowes, Builders. Maudslay, Engineers.	Wizard	5,070	27·164	..
	Conflict	4,882	27·102	..
	Teazer	4,843	27·11	..
Vickers, Sons, & Maxim	Avon	5,986	30·251	2·53
	"	6,243	30·164	..
	Bittern	6,412	30·354	2·48

Some more recent results, derived from various sources, are as follows :—

Name.	Builders.	I.H.P.	Mean Revolutions.	Mean Speed per 3 Hours.
				Knots.
Angler . . .	Thornycroft	5820	398·85	30·409
Avon . . .	Vickers	6243	384·6	30·164
Ariel . . .	Thornycroft	6143	396·7	30·594
Bittern . . .	Vickers	6659	395·7	30·403
Coquette . .	Thornycroft	5740	383·9	30·371
Fawn . . .	Palmer	6581	402·9	30·462
Flirt . . .	Palmer	6452	..	30·14
Mermaid . .	Hawthorn Leslie	..	..	30
Sylvia . . .	Doxford	6500	383	30·009

There are 108 destroyers completed, building, or projected. Of the first forty-two, of 26 to 27 knots speed, which were ordered in 1894, three remain to be delivered, viz.: the Fervent and Zephyr, building at Paisley, and the Wizard at Cowes. The Conflict was delivered in February, 1899. Of the fifty destroyers of 30 knots speed, eleven are in commission, twenty-one in reserve, and eighteen still in the contractors' hands. In addition, there are three experimental destroyers of 32 to 33 knots speed, the Arab, Albatross, and Express, one, the Viper, in which the steam turbine is to be fitted, and twelve forming part of the programme of last July. The Viper, which is building at Elswick, is 220 ft. long, and of 330 tons displacement.

The Albatross, which was launched by Messrs. Thornycroft, at Chiswick, on June 19th, is thus described in the *Times*:—"The Albatross is 227 ft. long by 21 ft. 3 in. wide. This is longer and wider than any destroyer yet built by this firm. The vessel is constructed of mild steel below the water-line, the upper part being of a special description of hard steel, having a considerably higher tensile strength than the ordinary steel, thus allowing the scantling to be much lighter. The vessel in general respects is designed on the same lines as the other 'destroyers' built by the Chiswick firm, but, of course, has more displacement in consequence of her larger dimensions. The armament will consist of one 12-pr. Q.-F. gun and five 6-prs. There are also two 18-in. torpedo tubes on deck. The propelling machinery consists of two sets of three stage compound engines, each having four cylinders of the Thornycroft balanced type. Steam is supplied by three water-tube boilers of the Daring type. They will work at 250 lb. pressure, 210 lb. to the square inch being the *maximum* pressure hitherto carried on these vessels. At

about 400 revolutions per minute the estimated horse-power will be 8000 indicated, and this is calculated to give a speed of 32 knots, that being the guaranteed speed."

Several destroyers have been refitted. The Thrasher, on which £5000 was spent after her accident in 1897, can now only steam 26 knots, whereas in her original trials her speed was over 30 knots. The Dasher has had Thornycroft water-tube boilers fitted in place of her locomotive boilers. With 3888 I.H.P. she attained a speed of 27 knots. With locomotive boilers her maximum I.H.P. was 3200.

Refits. Turning to vessels refitted, the first-class cruiser Edgar, which has been almost continuously in commission since May, 1893, and has cost less than £10,000 in dockyard repairs, attained a speed of 18·8 knots with natural draught and 8996 I.H.P. after her refit. She belongs to the most efficient class of cruisers recently built for the British Navy. The second-class cruiser Sirius is now only equal to 17 knots, whereas in 1890 she steamed 19 knots. The third-class cruiser Philomel, on the other hand, has attained 16·3 knots—a rather higher speed than when she ran her contractors' trials. The torpedo gunboats Salamander, Sheldrake, and Seagull have been fitted with water-tube boilers. The Sheldrake, which has the Babcock and Wilcox type, steamed 20·5 knots with 4050 I.H.P., the coal consumption being 1·5 lbs per I.H.P. per hour.*

Merchant cruisers. The value of mercantile auxiliaries of large coal capacity and high ocean speed was well exemplified during the Spanish-American war by the services of the St. Paul, St. Louis, Harvard, and Yale. The following table, which gives the average speed of the best passages made by some of the fastest of the British merchant cruisers in the Admiralty lists, will therefore be of interest:—

CUNARD LINE.

Campania	21·21 knots,	outwards.
Lucania	21·99 „	homewards.
Etruria	19·74 „	outwards.
Umbria	18·88 „	„

WHITE STAR LINE.

Majestic	19·65 knots,	outwards.
Teutonic	19·90 „	„
Germanic	16·77 „	homewards.

The Kaiser Wilhelm der Grosse, of the North German Lloyd, holds the record with an average speed of 22·51 knots.

* For other refits, *cf.* First Lord's Memorandum, Part IV.

The following regulations have been issued with regard to the increase of the number of officers:— *Personnel.*

"That the future numbers of the undermentioned ranks upon the active lists shall be as follows, viz.:— **Increase of officers.**

Flag officers, 80:—		
Admirals of the Fleet	3	
Admirals	12	
Vice-Admirals	22	
Rear-Admirals	43	
		—80
Captains		245
Commanders		360
Lieutenants (including lieutenants for navigating duties)		1550

"That the rate of increase in the executive lists be as follows:—

Flag Officers: One each year, commencing on January 1, 1899.

Captains: Annual increase of four in 1898, five in 1899, five in 1900, and so on in each succeeding three years.

Commanders: Six each year, commencing with 1898.

"And that the rates of increase sanctioned by your Majesty's Order in Council of July 16, 1895, shall be cancelled so far as they relate to the captains' and commanders' lists.

"And we further beg leave to recommend that your Majesty may be graciously pleased to authorise us to increase the lists of chief gunners, chief boatswains, chief carpenters, and warrant officers, to the following numbers, viz.:—

Chief gunners and chief boatswains (including ten officers holding such rank by virtue of their appointments)	100
Chief carpenters	20
Gunners and boatswains	1150
Carpenters	240

Over 6000 men were added to the permanent force of the Navy last year, and a further increase of over 4000 men is proposed for the current year. This increase may have disastrous consequences for the best interests of the Navy in the future. We have been passing through a period of prosperity, with an expanding revenue, sufficient to meet the growing demands for the Army and Navy, but there are good reasons for believing that the prosperity in the shipbuilding, engineering, and kindred trades, including all those which **Increase of men.**

supply the materials for ships and engines, is due partly to the making up of ground lost during the engineering strike, partly to the large amount of money which is being spent by the Government. We may certainly expect to see ere long a period of depression. When that period arrives there will be a demand for a reduction in the expenditure of our great spending departments; and, as far as the Navy is concerned, a reduction will have to be made in the shipbuilding vote, because it necessarily takes many years to reduce the charge on the Navy Estimates for the *personnel.*

Naval Reserve.

Such considerations as those just alluded to constitute the main reason why we have often urged in these pages that greater efforts should be made to increase the numbers of our Naval Reserves. By a curious coincidence, on the same day (July 27th, 1898), statements were made by two members of Her Majesty's Government, which showed that attention was being devoted to this question. Mr. Goschen, replying to a deputation of the British Empire League, announced that he was prepared, with certain reservations, to recruit for the Royal Naval Reserve in the Colonies. Mr. Ritchie, in proposing in the House of Commons that the Mercantile Marine Fund Bill should be recommitted, brought forward a scheme under which a grant of £62,559 was to be made to shipowners, in consideration of their carrying in their ships 16,150 boys, who were to be enrolled in the Royal Naval Reserve.

In Colonies.

The Admiralty have taken steps to carry out Mr. Goschen's promise by issuing circulars in the Colonies through the Naval commanders-in-chief on the stations. The unfavourable reception which these circulars are reported to have met with in New Zealand will surprise no one who has studied the Naval Reserve question in Australasia. The present retaining fee of £6 should attract a considerable number of Newfoundland and Canadian fishermen, but is insufficient to induce many Australians to enlist. A satisfactory solution of the difficulty will probably be found by the Federal Government shortly to be established in Australia.

Mr. Ritchie's scheme.

Mr. Ritchie's proposal has been strongly condemned at meetings of shipowners in Liverpool and elsewhere, on account of the connection between the carrying of apprentices and the light dues; but it is to be hoped that some better scheme may yet be devised—whether that put forward by the Navy League, or some modification of it—which will have the effect of encouraging British shipowners to carry British boys. It is satisfactory to know that recruits are coming forward well under the new regulations,* which admit of lads joining the Naval Reserve at the age of eighteen instead of nineteen,

* *Cf.* First Lord's Memorandum.

and at once performing their six months' training in the Navy. It is only proposed to add 1000 seamen to the Naval Reserve during the year 1899-1900, and to provide for the embarkation of 2000 men.

Navy League scheme. The scheme drawn up by a committee of the Navy League is worthy of some consideration. The principal points are as follows:—

1. Boys taken straight from the public elementary schools to be entered on depôt training-ships, and indentured for four years to officials appointed by the Board of Trade, the first year to be passed on the depôt ship, and the last three on ships of the mercantile marine.

2. Boys to be bound to serve their time and pass as qualified seamen in the Naval Reserve.

3. Payments to be made to selected shipowners for taking boys at the rate of, say, £1 per month for the first year, 15*s*. per month for the second year, and 10*s*. per month for the third year.

4. The cost of the scheme to be provided by the Board of Trade.

Fuller details of this scheme are given in Part IV. The establishment and maintenance of the depôt training-ships will be costly, but it is hoped to obtain assistance from the technical education funds under the control of County Councils. It would appear hardly necessary to subsidise shipowners for carrying the boys during their fourth year of apprenticeship and third year at sea.

Marines. Strong complaints have appeared in various newspapers as to the decline in efficiency of that most valuable force, the Marines, which has been ascribed, amongst other causes, to the paucity of officers, the deductions from pay for rations, and the increasing proportion of service passed afloat. That the Admiralty have decided to increase the net pay of the Marines on shore by 2*d*. a day shows that there has been some foundation for these complaints.

Estimates for 1899-1900. The Estimates for 1899-1900 amount to £26,594,500, as compared with £23,778,400 for 1898-1899. The new shipbuilding programme includes two battleships (design not yet decided), two armoured cruisers of 9800 tons, three smaller cruisers and two sloops. In spite of the large increase of nearly three millions sterling, the Estimates have been favourably received.

CHAPTER II.

Progress of Foreign Navies.

France.

Ministerial instability, which has always operated disastrously upon the progress of the French Navy, brought about a new change and a fresh direction of policy in 1898. Admiral Besnard, who laid down the naval portfolio on June 28, had held it for twenty-six months, this being a longer tenure of office than had been enjoyed by any of his predecessors since M. Barbey. M. Lockroy, whose ideas are inspired by the school of Admiral Aube, and who had been regarded in the navy as an "expert," had previously been Minister of Marine for a short time, and had published his programme of reforms in a volume entitled "Six Mois Rue Royale." Important administrative changes had been introduced during his service at the Ministry, but most of these were reversed by Admiral Besnard, and, since his return to office, M. Lockroy has re-established the dispositions before made for the central administration and the constitution of the naval staff. Apart from these internal changes, the chief features of the new policy have been the attention devoted to matters of coast defence, the provision made for the establishment of *points d'appui*, or naval bases, in various colonies and stations, and the re-organisation of the squadrons.

Coast Defence.

The political ferment and partial naval mobilisation which arose from the incident of Fashoda coincided with a series of visits which the Minister paid to the naval ports and to the stations in the Mediterranean. While he was at Brest, the Northern Squadron went through the exercise of forcing the Goulet. The forts, batteries, signal stations and search-lights were manned, and the conclusion was reached that the troops then available were altogether insufficient for the duties they had to perform. Similar operations were repeated at Cherbourg and Toulon with the same result, and the War Department therefore placed at the disposal of the Navy a considerable number of men, who were incorporated in the marine troops to serve in the forts and batteries depending upon the naval service. The infantry battalions which had been detached in Paris were recalled to the ports, and on February 1, 1899, five new batteries were added to

the Marine Artillery, of which two are at Brest, two at Cherbourg, and one at Toulon. M. Lockroy's visit to Corsica has led to the formation of a body of Corsican chasseurs, the increase of the garrison of Bonifacio, the acceleration of the defensive works at Bastia, Ajaccio and Bonifacio, and the planning of a large station of the mobile defence at Porto Vecchio. His visit to Tunis has resulted in increased activity in the defensive works at Bizerta, and the construction of the repairing yard at Sidi Abdallah at the end of the lake. The sea passage is to be deepened, a torpedo station is being made ready at Sfax, and two batteries of artillery have been added. In more distant waters the naval bases selected are: Fort de France, Martinique; the Saints, Guadeloupe; Dakar; Cap Saint Jacques, Cochin China; Port Courbet, Tonquin; Noumea, New Caledonia; Diego Suarez, Madagascar; Port Phæton, Tahiti; Libreville, Congo; and Obock.*

Reorganisation of squadrons.

The six battleships, Formidable, Amiral Baudin, Amiral Duperré, Dévastation, Courbet, and Redoutable, which for many years have formed the strength of the French Mediterranean Fleet, have been transferred to the Channel. They were launched between 1876 and 1885, and can no longer be considered of the first-class. The newer coast-defence ships, Bouvines, Amiral Tréhouart, Jemmapes, and Valmy, have been transferred from the Channel to the Mediterranean Squadron, and, with the Caïman, are now in commission as a division, under Rear-Admiral Caillard. The Mediterranean Squadron, under the command of Vice-Admiral Fournier, comprises also two armour-clad divisions (Rear-Admirals Roustan and Maréchal), each with three battleships, and has attached to it another division (Marceau, Magenta and Neptune, with the transport Calédonien) for gunnery and torpedo training work (Rear-Admiral Godin), as well as a light squadron composed of four groups of cruisers, and a flotilla of six sea-going torpedo-boats. The plan of devoting battleships to the work of special training has met with much adverse criticism, and it has practically been decided to restore the Couronne and Calédonien as the gunnery school, and the Algésiras for torpedo work, and to return the three battleships to their routine work with the squadron. Another important change is the reduction of the Far East squadron to the rank of a division, through the return of the Bruix and Eclaireur. The old Bayard is to be replaced by the D'Entrecasteaux, as flagship of Rear-Admiral Courjolles.

Battleships completed.

Four battleships have been completed during the year. Of these, the Masséna, of which a full description was given in the *Naval*

* As we go to press an agreement has been reached by which the French secure coaling facilities in Muscat, but without lease of territory.

Annual for 1898, was practically ready in April, 1898. The Bouvet, displacement 12,200 tons, speed 17½ knots, was completed during the summer. She carries the same armament as the Masséna, viz., two 12-in., and two 10·8-in. B.L., and eight 5·5-in. Q.-F. guns. Both are now in commission in the first division of the Mediterranean Squadron. The Charlemagne and Gaulois have been completed, and the third battleship of the same type, the St. Louis, will probably be ready in the spring. These ships have been described in previous volumes of the *Annual*. Their principal features are: displacement, 11,275 tons; I.H.P., 14,500 tons; speed, 18 knots. The main armament consists of four 12-in. guns mounted in pairs in heavily armoured turrets, forward and aft, on the English system. The auxiliary armament includes ten 5·5-in. and eight 3·9-in. Q.-F. guns; the former carried in an upper-deck battery behind 3-in. armour. These ships have a continuous water-line belt, 9¾-in. to 15¾-in. thick. Their weakness consists in the absence of protection on the side below the battery.

Trials of battle-ships.

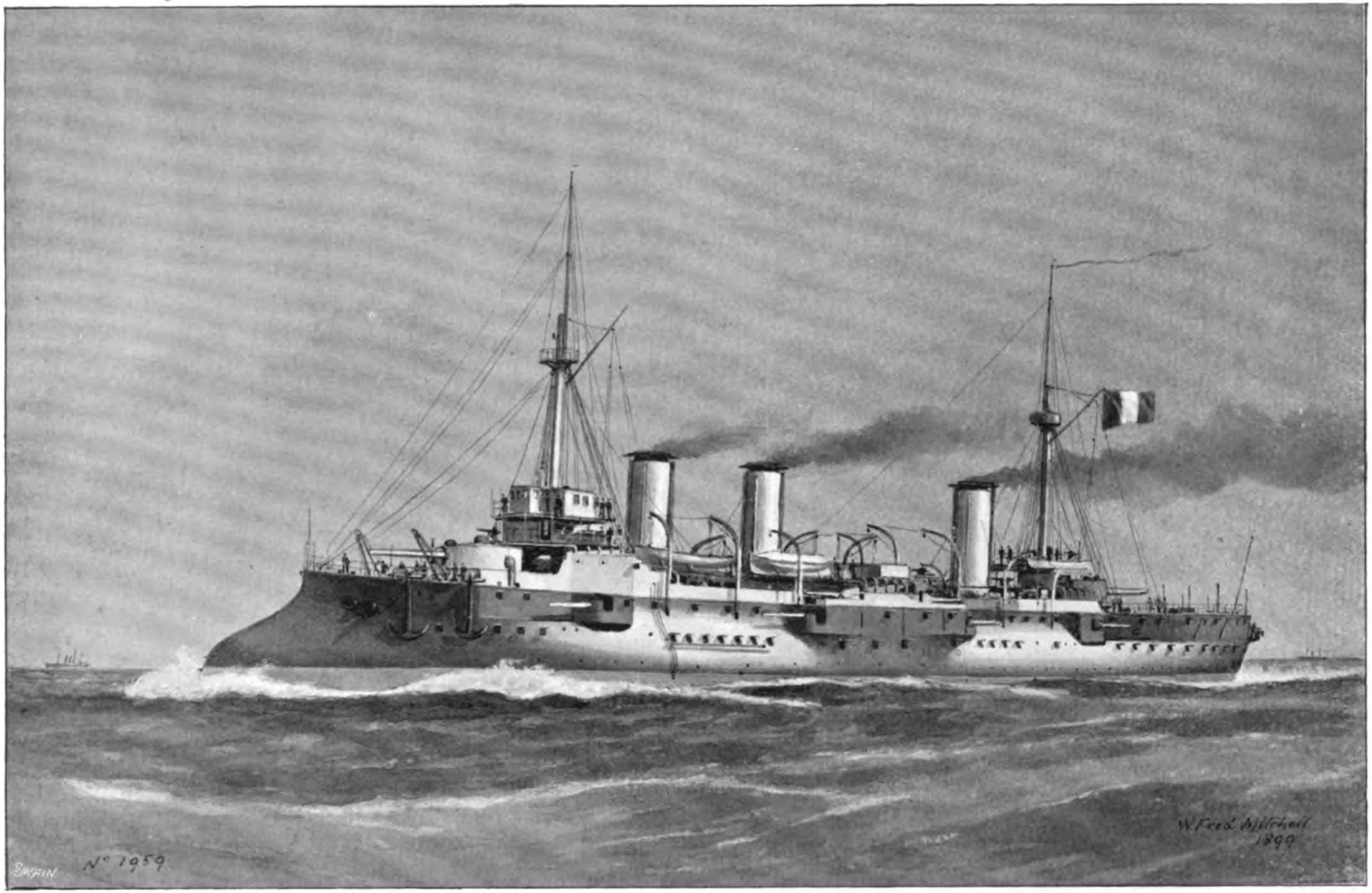
The Masséna, constructed by the Chantiers de la Loire, completed her trials at Brest, under severe conditions, in May. The contract speed during a six-hours' trial, with the three engines, and twenty-four fires lighted, was 17 knots; and there was to be a penalty of 50,000 francs for each tenth of a knot wanting, and of 100,000 francs for each tenth after the third, with right of rejection if the speed fell below 16 knots. The early trials had been unsuccessful, as was recorded in the *Annual* of 1898, but, finally, with 125 revolutions and an average of 13,460 I.H.P., the speed, upon the measured course at Douarnenez, was 17·09 knots, with a coal consumption of 1·94 lbs. per I.H.P. per hour. The twenty-four hours' trial was completed with success.

Bouvet.

The Bouvet, which was built at Rochefort, made her trials at Toulon instead of at Brest, as was intended. She has three vertical triple-expansion engines supplied with steam by Belleville boilers, and the anticipated speed with 14,000 horse-power was 17·5 knots. At the four hours' trial in May the ship steamed at 18·18 knots against a strong breeze from the west, which was the best speed recorded of any French battleship, the Charles Martel, which held the record, having steamed at 18·13 knots. The twenty-four hours' trial in June gave full satisfaction, and the Bouvet shortly afterwards joined the squadron.

Charlemagne.

In the case of the Charlemagne, the contract provided that 9000 horse-power should be maintained for twenty-four hours with a consumption of 1·76 to 1·87 lbs. per I.H.P. per hour. With 9270 horse-power and 112 revolutions a speed of 16·41 knots was attained,



"D'ENTRECASTEAUX,"

FRENCH CRUISER.

and only 1·55 lbs. of coal per hour were consumed. At the natural draught trials, with 11,460 I.H.P. and 119·6 revolutions, the speed was 17·25 knots, and at the full speed trials, with 15,292 I.H.P., 18·139 knots.

The following are particulars of the trials of the Gaulois :—July 19, 5490 I.H.P.; 96 revolutions; coal, 1·36 lbs.; 14·3 knots. July 23, 11,126 I.H.P.; 119·8 revolutions; coal, 1·62 lbs.; 17·15 knots. July 30 (middle screw only), 4580 I.H.P.; 114 revolutions; coal, 1·61 lbs.; 13·03 knots. August 8 (lateral screws only), 4541 I.H.P.; 100 revolutions; coal, 1·32 lbs.; speed, 13·08 knots.

The battleship Henri IV. proceeds slowly at Cherbourg. Her stern-post was placed in position in January.

Cruisers completed. Turning to the cruiser classes, the D'Entrecasteaux, the "commerce-destroyer" Guichen, which was launched on October 26, 1897, and the second-class cruisers Catinat and Protet (the latter described below), have been completed. After some trouble the D'Entrecasteaux attained a speed of 19·2 knots with 14,630 I.H.P. The estimated speed was 19 knots with 13,500 I.H.P. The Guichen is of 8277 tons displacement, and her maximum speed, with 24,000 horse-power, is 23 knots. She was fully described last year.

Kersaint. The sloop Kersaint, 1243 tons, 2200 horse-power, which has been built for service in Eastern waters, and will join the China squadron, was completed in 1898. She is of steel sheathed with wood and copper, and has a speed of a little over 15 knots. She is somewhat heavily armed, and carries six Q.-F. guns capable of firing mélinite shells, viz.: one 5·5-in. forward, and five 3·9-in. (of which four are mounted on sponsons, permitting fire fore and aft, and one at the stern), besides seven 1·4-in. Q.-F. guns. Her radius of action is theoretically 4000 miles at 10 knots, and 1000 miles at 15 knots, but this will probably be exceeded on service.

Dunois. Another vessel completed during last year is the torpedo-gunboat, or large destroyer, Dunois, a similar vessel to the Lahire. She has nominally 7000 horse-power, but after many failures developed 7300 at her trials. The speed is 23 knots, and 19·3 knots was reached with natural draught and 3600 I.H.P. In the twenty-four hours' trial the speed was 18·1 knots and the coal consumption 1·58 lbs. Like the Lahire, the ship is to carry briquettes instead of ordinary coal, whereby it is estimated that her endurance will be increased one-third.

Ships launched. The vessels launched in 1898 were the battleship Iéna, the "commerce-destroyer" Châteaurenault, the second-class cruiser Protet, the torpedo-gunboat Lahire, the destroyer Durandal, the sea-

going boat Cyclone, and ten first-class boats: these displacing in all 26,362 metric tons. All these vessels, with the exception of the Iéna and Châteaurenault, and some of the torpedo-boats, are practically completed.

Iéna. The first-class battleship Iéna, which was laid down at Brest on January 15, 1898, was launched in September; this being a record performance. She is of similar type to the Charlemagne, but carries a more powerful secondary armament, and a rather larger supply of coal. Her principal particulars are: displacement, 12,052 tons; I.H.P., 15,500; speed, 18 knots. The normal coal-supply is 850 tons, which can be increased to 1100 tons, the corresponding endurance at 10 knots speed being 5200 and 7000 knots. She has three propellers, and was described in the *Naval Annual* of last year. The water-line belt is of face-hardened steel, 13·8 ins. thick amidships, tapering towards the ends. There is a thin belt above, 4·7 ins. to 3 ins. thick, rising higher at the bow than aft. Wood has been almost completely eliminated, even from the fittings.

Jeanne d'Arc. There has been some delay with the armoured cruiser Jeanne d'Arc, but she is now well advanced and is expected to be launched in 1899.

Châteaurenault. The "commerce-destroyer" Châteaurenault, of the same type as the Guichen, was launched on May 12 at La Seyne, and is by contract to be delivered on April 9 next. She was designed by M. Lagane. Displacement, 8018 tons; I.H.P., 23,000; speed, 23 knots; coal supply, 2100 tons; steaming range, 7500 miles at 12 knots; vertical triple-expansion engines and Normand-Sigaudy boilers. The armoured-deck is 2½ ins. in thickness. At its centre it is about 3 ft. above the water-line and at the side it is 4½ ft. below it. The guns are protected by fixed redoubts and revolving shields, both 2 ins. thick. The complement, including officers, is 625. The armament includes two 6·4-in. Q.-F. guns, one on the poop, the other on the forecastle, and six 5·5-in. Q.-F. guns on the upper deck, which is covered in, as in the new British cruisers. With the view of deceiving adversaries as to her real character, the Châteaurenault is built to resemble a mail steamer, and has a straight stern.

Protet. The second-class cruiser Protet was launched from the Chantiers de la Gironde on July 6. Displacement, 4055 tons; length, 331 ft.; beam, 44 ft. 8 in.; draught of water, 21 ft. 1 in. The armament comprises four 6·4-in, ten 3·9-in. (six of which are mounted on sponsons and four on the spar deck), ten 1·8 in., and two 1·4-in. Q.-F. guns. The cruiser has Belleville boilers and vertical triple-expansion engines. Under forced draught, the estimated horse-power is 9000, and speed 19 knots. At her trials the Protet, with 9300

I.H.P., attained a speed of 20·22 knots. She has a steaming range of 6000 miles at 10 knots, and 1000 miles at full speed. The Protet, like her sister-ship, the Catinat, is sheathed.

The torpedo-cruiser Fleurus, launched in 1893, has had continuous trouble with her trials, but has at last attained a speed of 17·6 knots with 3800 I.H.P., and is to be commissioned.

Lahire and Durandal. The Lahire (896 tons), alluded to above, was launched at Cherbourg in November. She is practically a large destroyer with a nominal speed of 23 knots. The Durandal, launched on February 11th, 1899, which is a sister of the Hallebarde, is more properly a destroyer, but has a speed of only 26 knots. She is credited with great stability, and carries for her displacement of 300 tons the considerable armament of one 2·5-in. and six 1·8-in. Q.-F.

Torpedo-boats. It is unnecessary to repeat the description of the new torpedo-boats, which was given in the *Annual* last year. The Cyclone, sea-going boat, completed her official trials in November, steaming at over 30 knots. She thus ranks with the Forban, and is the second of French torpedo-boats to attain that speed. She belongs to a larger and better type than the older boats, and has greater coal capacity. The first-class boats mark also considerable advance upon their predecessors.

Trials of the Gustave Zédé. Very considerable attention was attracted to the trials of the submarine boat Gustave Zédé in January last, and the results attained created in France a wave of enthusiasm, which induced the *Matin* to open a subscription with the view of presenting a new boat of the class to the nation. The concluding trials took place at the Salins d'Hyères on January 7th, and confirmed the impression already received. At a signal from the Magenta, the submarine boat, after some preliminary evolutions, advanced towards the battleship, plunged at a distance of about 550 yards, reappeared again at a distance of more than 200 yards, and plunging again, discharged her missile, which struck the Magenta abreast of the funnels. The mark presented by the Zédé when she showed her cupola above the surface for observation of her course was very small and inconspicuous, so that it would have been practically impossible to hit her. The trials were popularly accepted as a complete success, for after the torpedo trials the boat was able to proceed unaided from Toulon to Marseilles, thus showing her sea-going qualities. "Jamais nous n'aurons trop de sous-marins," wrote M. V. Guilloux in the *Yacht*. "Les douze années d'efforts consécutifs et d'études continues pour obtenir une solution à la question de la navigation sous-marine sont enfin couronnées de succès," said the *Moniteur de la Flotte*. For our own part we do not share the French belief in submarine boats. They

have little chance of attacking a ship under way, or if operating at a distance from their base. Marc Landry (Lieut. Maurice Loir), writing at a later date in the *Moniteur*, remarks that Frenchmen go too fast in proclaiming that these isolated trials sound the knell of the battleship. He, nevertheless, believes the submarine boat to be a real element in naval war, because the very fear of its invisible attack will keep at a distance adversaries who might have an object in approaching the coasts. The Zédé is propelled entirely by electricity, and is impeded by the weight of her accumulators and short range, but the new boats of the Narval class will have steam for surface navigation, giving much greater range, and Lieut. Loir remarks that, if success attends these boats, the question of submarine warfare will have advanced a great step.

Ships laid down.

Suffren.

The main features of the battleship Suffren, *ex*-A 9, which was laid down in January at Brest, have been made public. She is to be an enlarged Iéna, and will be built from the designs of M. Thibaudier. Displacement, 12,728 tons; length, 411 ft. 9 in.; beam, 70 ft. 4 in.: draught of water aft, 27 ft. 6 in.; the armament will consist of four 12-in. guns coupled in turrets which can be worked by hand or electricity; ten 6·4-in. Q.-F. guns (as compared with eight in the Iéna), of which four will be on the main deck in casemates, flanking the heavy guns, and six on the upper deck in turrets; eight 3·9 in. Q.-F. guns on the superstructure; twenty 1·8-in. Q.-F. guns and four torpedo-tubes, of which two will be submerged. Protection is to be afforded by a complete water-line belt, lighter armour on the side above the belt, and two armoured decks. The propelling machinery, which has been ordered from the Indret works, will consist of three triple-expansion engines, placed in separate compartments, and each driving a screw. Steam will be supplied by Belleville boilers, fitted with economisers, and the speed with 16,200 I.H.P. is expected to be 18 knots. The normal supply of coal and oil will be 820 tons, but with patent fuel this can be increased to 1150 tons in the bunkers. The endurance at 10 knots will be 5100 and 7020 miles respectively.

First-class cruisers.

Included in the programme of 1897–98 were nine armoured cruisers of two types: the Dupetit-Thouars, Gueydon, Montcalm, C 4, C 7, and C 8 were to be of 9517 tons, the Desaix, Kléber and Dupleix of 7700 tons displacement. Both these types were described last year, but it has been decided to increase the displacement of C 4, C 7, and C 8, which have been named the Condé, Sully, and Gloire, to 10,000 tons. The increase in displacement has been devoted to (1) increasing the thickness of the upper side armour from 3·8 ins. to 5·1 ins. and of the armoured deck and splinter deck to 1·7 ins. and

Condé, Sully, Gloire.

1·3 ins. respectively; (2) providing better protection for the 6·4-in. guns; and (3) to an increase of engine power. The armament will be the same as in the Montcalm, viz., two 7·6-in. guns in closed turrets, forward and aft, eight 6·4-in. Q.-F. guns, of which four will be mounted in turrets on the spar-deck amidships and four in casemates, the casemate armour being carried down to the belt, whereas in the Montcalm the side below the casemates is unprotected, and six 3·9 in. Q.-F. guns. Besides two submerged torpedo-tubes there will be three above-water-tubes, which are strongly condemned by the *Yacht* in the light of the experience of Santiago. The horse-power will be 20,000 instead of 19,600.

The cruisers of 7,700 tons are protected by a belt which for four-fifths of the length of the ship rises to only 3 ft. 3 ins., whereas forward it rises to 9 ft. 9 ins. above the water-line. It is carried down to 4 ft. below the water-line, but stops at 68 ft. from the stern. Of the ten 6·4-in. guns, two are mounted in closed turrets forward and aft, while eight are mounted in casemates, four on sponsons amidships, and four in indented ports on the bow and quarter, so as to give an end-on fire. The casemate armour is of the same thickness as in the Montcalm. The Desaix and Dupleix will have 24 Belleville boilers, the Kléber 16 Niclausse boilers. Desaix, Kléber. Dupleix.

The new programme, which has not yet received the sanction of Parliament, included the following vessels:—A battleship, "A 8," probably of 14,500 tons, and of the Iéna class enlarged (but for which no credit is asked); two armoured cruisers, "C 9" and "C 10," of the Gloire class, 10,014 tons, 20,500 I.H.P., water-tube boilers, 21 knots speed, armament two 7·6-in., eight 6·4-in., six 3·9-in., and twenty-six smaller Q.-F. guns; two second-class cruisers of a new class (*croiseurs-estafettes**), "H 4" and "H 5," 4000 tons, 15,000 I.H.P., water-tube boilers, 23 knots speed, armament eight 3·9-in. and sixteen smaller quick-firers; two destroyers of the Hallebarde class, "M 8" and "M 9"; four seagoing torpedo-boats, "N 18" to "N 21"; eleven first-class torpedo-boats, "P 64" to "P 74"; and six submarine boats of the Narval type, "Q 5" to "Q 10," with electric motors for under-water navigation, and steam for surface propulsion. The total outlay for new construction in 1899, according to the Ministerial proposals, will be £3,158,156. In his report upon the estimates, M. de La Porte expresses unreserved approval of the Minister's purpose of retarding the proposed battleship and devoting all available resources to cruisers and submarine boats. Programme of 1899.

The very extensive series of refits and changes in vessels now going Refits.

* The *croiseurs-estafettes* are intended to keep up communications between the scouts of a fleet, the fleet itself, and the base of operations.

forward in the French fleet, upon a programme extending to the end of the year 1900, was partially described last year, and it may be useful to complete briefly and recapitulate. The Hoche has received multitubular boilers, with changes in the machinery, and modifications of structure to reduce weight. The Amiral Baudin has been altered like the Formidable, and is already out of hand, losing her midship barbette and receiving a new armament. The Caïman will have new boilers, her turrets modified, 10·8-in. guns in place of the old 16·5-in. guns, and improvements of the secondary armament; and like changes will be made in the Requin, Terrible,* and Furieux. The Indomptable's 16·5-in. guns will be replaced by 10·8-in. guns; and six 4-in. Q.-F. guns, protected by 2-in. shields, will be mounted. The Marceau, Magenta, Neptune, Dévastation, and Amiral Duperré will be supplied with water-tube boilers, the first three having their superstructures reduced, and the two last-named undergoing changes in their armament. The Dévastation has now only two masts (instead of three), of equal height, each with two fighting tops—a change to be made also in the Amiral Duperré and Courbet. Her new armament includes four new 10·8-in. and four 9·4-in. guns in place of the old 12·5-in. and 10·8-in. guns, while the Duperré will have her midship barbette removed, and the heavy gun replaced by four of 6·4-in. calibre, as in the Formidable and Baudin.

Personnel. The expansion of the fleet has caused the Government to propose an increase in the number of officers—1 vice-admiral, 5 captains, 25 commanders (*en résidence fixe*), 75 lieutenants (of whom 25 *en résidence fixe*), and 80 sub-lieutenants. The following table gives the numbers:—

	Old Establishment.	New Establishment.
Vice-Admirals	15	16
Rear-Admirals	30	30
Captains	125	130
Commanders	215	240
Lieutenants	754	829
Sub-Lieutenants	420	500
Cadets	170	170

The Navy League. In January an influential movement was initiated for the promotion of a Ligue Maritime Française, which has been crowned with success. M. Lockroy, who is himself a member, has commended the League through the maritime prefects to the Navy, and large numbers of naval officers and civilians, including ladies, have joined. The subscription for associate members is 3 francs a year. The purpose of

* The Terrible is out of hand.

the League is to further the development of the Navy, of the mercantile marine, and of the auxiliary fleet, as well as the increase of French submarine cables, and of channels of internal navigation. It is also to commemorate national festivals and naval victories, to organise naval festivals in France and the colonies, and to arouse public interest by lectures and writings.

A terrible explosion took place in March, 1899, in one of the powder magazines at Lagoubran, near Toulon, causing the loss of many lives. **Explosion at Toulon.**

Germany.

Last year some particulars were given of the Naval Defence Act, or Sexennate, under which the German Navy is being increased upon a fixed and definite plan. Owing to the action taken by the Clerical Party and the Budget Committee in the Reichstag,* it was finally decided to spread the expenditure over a period of six years instead of seven, as originally contemplated, viz., 1898–1903 inclusive. The final acceptance of the new law, which was promulgated on April 10th, 1898, gave the greatest satisfaction to the Emperor and to the Navy at large. The following are the details of the measure. The German Fleet, exclusive of torpedo-boats, training-ships, special service vessels, and gunboats, is to be formed thus:— **The New Navy Law.**

Active List.	1 Flagship (battleship).	
	2 Squadrons, each of 8 battleships.	
	2 Divisions, each of 4 coast-defence ships.	
	6 Large cruisers 16 Small cruisers	for the Home Squadron.
	3 Large cruisers 10 Small cruisers	for Foreign Service.
Reserve.	3 Battleships.	
	3 Large cruisers.	
	3 Small cruisers.	

The ships completed or in hand on April 1, 1898, and accepted as forming part of this prescribed establishment, were 12 battleships, 8 coast-defence ships, 10 large and 23 small cruisers, but some of these will pass out of the active category before the expiration of the Sexennate, and within the period of six years other battleships and cruisers are to be laid down and completed to make up the legal number. The principles regulating the supersession of ships considered to be antiquated are laid down in the Act. The active life of

* Cf. footnote, p. 32, *Naval Annual*, 1898.

a battleship or coast-defence vessel is reckoned at twenty-five years, of a large cruiser at twenty years, and of a small cruiser at fifteen years, these periods being counted from the date of the first credit for the building of any particular ship up to the same grant for the laying down of her successor.

Personnel. The establishment of officers and men to be maintained is estimated, in relation to the strength of the fleet, upon the following principles: For every ship abroad, half as many again must be voted as are necessary; there must be full companies for the ships belonging to the active formation of the Home Squadrons, for one half of the torpedo-boats, and for the training and special service ships; there will be a nucleus (two-thirds being engineering *personnel*) for the reserve formations at home and for the other half of the torpedo-boats; the necessary number for service ashore, and an addition of 5 per cent. to the whole number.

Programme of 1898–99. The shipbuilding programme of 1898 included votes for the completion of the battleship Kaiser Friedrich III., of the second-class cruisers Hansa and Vineta, of the smaller cruiser Gazelle, and the gunboats Jaguar and Iltis; for the continuation of work upon the battleships Kaiser Wilhelm II. and Ersatz König Wilhelm, and the armoured cruiser Fürst Bismarck; and for the laying down of two battleships, "A" and "B," a large cruiser, "A," the small cruisers "A" and "B," two gunboats, Ersatz Wolf and Ersatz Habicht, one torpedo division boat, and certain torpedo-boats, as well as for completing the reboilering of the ships of the Sachsen class.

The battleships "A" and "B," building by Blohm and Voss, Hamburg, and Herr Schichau, Danzig, are to be completed in four years; cost, £698,529 each; the armoured cruiser "A" at the Imperial Yard, Kiel, in three years; cost, £568,627; and eight torpedo-boats by Schichau at Elbing, in two years; cost, £156,078.

Launches. Five vessels were launched in the year 1898—the cruiser Hansa at Stettin (Vulcan); the Gazelle (*ex* "G"), at the Germania Yard of Herr Krupp, Kiel; the gunboats Jaguar and Iltis (*ex* Ersatz Hyäne and Ersatz Iltis), at the Danzig Yard of Herr Schichau; and the destroyer "D 10," built by Messrs. Thornycroft at Chiswick.

The Gazelle displaces 2650 tons, and is 328 ft. long, with 38 ft. 7 in. beam, and 15 ft. 9 in. draught. She carries ten 4·1-in. and fourteen 1·4-in. quick-firers, with four machine and two light guns. Engines of 7000 I.H.P., supplied with steam by Niclausse water-tube boilers, are to give a speed of 19·5 knots. In addition to a 2-in. deck, there is protection—serving also to maintain equal temperature—of ashes and sawdust tightly pressed into cofferdams, as well as a layer of cork. Electricity is the power for all the auxiliary machinery.

The Jaguar and Iltis are sheathed gunboats of 895 tons, intended for tropical service. They carry an armament of fourteen small quick-firers, and the estimated speed with 1300 I.H.P. is 13 knots.

The Kaiser Friedrich III., which was launched in 1897, and has been described in previous issues of the *Annual*, made a forced draught trial at Wilhelmshaven on October 30. The ship has water-tube boilers and an estimated speed of 18 knots. This was easily reached with 13,500 I.H.P. and 115 revolutions, although a strong wind and heavy sea were against the ship. There are three sets of engines in water-tight compartments, each driving a screw, and twelve boilers in pairs in water-tight compartments. The decks and stairways of the ship are of steel, and though a little wood is used for interior fitting, it has been banished from the ship wherever possible. Trials—Kaiser Friedrich III.

The battleship Baden, which, like the other vessels of the Sachsen class, has been in hand for reconstruction, has made very successful trials. She was the first German battleship to be fitted with Dürr boilers, and it would appear that the satisfactory results will lead to boilers of the same make being supplied to the Sachsen and Württemberg. In the six hours' trial, in which 6000 I.H.P. and 17 knots speed were expected, 6200 I.H.P. and 17·3 knots were reached. Before the reconstruction 12 knots was the speed of the ship. Wood has in great part disappeared; the ship has one large funnel in place of four, with consequent changes in the conning-tower and bridges, and the number of quick-firers has been increased. The battleship Bayern attained a speed of 15·5 knots under forced draught, the engines developing 6386 horse-power. Baden.

The second-class cruiser Freya has been fitted with Niclausse boilers, and her sister ships the Hertha and Hansa with Belleville, and the Victoria Luise with Dürr boilers. Considerable interest will therefore attend the performances of these vessels, although, as will be seen, the Dürr boiler has already been adopted for several important ships. The speed of these cruisers is 20 knots with 10,000 I.H.P., but the Freya developed 10,500 I.H.P. with a mean speed of 20 knots at her second trial. Freya class.

The torpedo division-boat or destroyer, which Messrs. Thornycroft have built, displaces 310 tons, and is therefore smaller than some of the Elbing boats, but she is longer, built upon finer lines, and much swifter. According to contract she is to steam at 27·5 knots in German waters, with German engineers and stokers. The trial on the Maplin Sands was satisfactory, the boat attaining a mean speed of 28·545 knots, with a load of 85 tons on board. "D 10."

The old battleship Kaiser went ashore in Samsah Bay, near

Foochow, but was refloated without serious damage. The torpedo-boat No. 85 was lost during a gale of wind near Fehmarn Island.

New programme. In the estimates for 1899 are provided the final instalments for completing the battleship Kaiser Wilhelm II., the cruiser Fürst Bismarck, and the gunboats Jaguar and Ersatz Iltis, and the first instalments for laying down three battleships (C, D, E) of the Friedrich III. type, and two small cruisers.

Personnel. The new Budget also provides for a further increase of *personnel*:—

Executive Officers	1118,	an increase of	48
Surgeons . .	142	„ „	10
Warrant Officers .	1119	„ „	89
Petty Officers .	5193	„ „	398
Seamen . .	18,079	„ „	950
Boys. . .	1000	„ „	250

ITALY.

Owing to the diversion of available resources to other purposes, new construction in Italy has progressed but slowly during the past few years. Several fine cruisers of the Garibaldi and Varese types laid down for the Italian government have been sold to Spain and the Argentine Republic, which had more urgent need for them.

Puglia. The cruiser Puglia was launched at Taranto on September 22, 1898. She is built of steel, and her dimensions are: length, 269 ft. 8 in.; beam, 41 ft.; draught, 16 ft. Her displacement is 2550 tons, and her I.H.P. under natural draught 4200, developing a speed of 17·2 knots, and under forced draught 7000, with a speed of 19 knots. She has two sets of horizontal triple-expansion engines, built by Orlando Brothers, with four cylindrical double-ended boilers and two screws. Her coal capacity is 650 tons, but petroleum also is to be used. Her armament is four 6-in. Q.-F. guns on the upper deck, six 4·7-in. Q.-F., some on the upper and some on the main deck, eight 6-pr. Q.-F. guns, eight 1-pr. Q.-F. guns, two machine-guns, and two torpedo-tubes. She has two military masts and a protected deck 1 in. thick, and she carries a complement of 257 men.

The torpedo-boat destroyer Fulmine has been launched at Sestri-Ponente (Odero), and the first-class torpedo-boat Condore at Ansaldo's yard.

Dandolo. The battleship Dandolo, 11,277 tons, has completed her rearmament and refit at Spezia. On her natural draught trial she easily maintained a speed of nearly 15 knots. Her forced draught speed is expected to be 18 knots. The cost of her refit has been so great that the

intention of repairing the Duilio has been abandoned. The coal supply suffices for 2300 miles at 12 knots.

Before his death Admiral Brin had prepared, with the assistance of the Naval Constructor, Comm. Micheli, the designs for some new battleships. Displacement, 12,765 tons; length between perpendiculars, 413 ft. 4 in.; beam, 78 ft. 2 in.; mean draught, 27 ft. There is to be an armoured belt of nickel steel, extending to within a short distance of the stern, rising to 6 ft. above and descending to 3½ ft. below the water-line. Amidships, the belt armour will be 6 ins. thick, diminishing towards the ends to 2 ins. The ends of the citadel will be enclosed by transverse bulkheads 10 ins. thick. The armoured deck will vary from 1½ to 3 ins. in thickness. The armament, which has been modified from the original design, will comprise four 12-in. breech-loading guns, mounted forward and aft in turrets protected by 6-in. armour, four 8-in. Q.-F. guns, in turrets at the angles of the citadel on the upper deck, twelve 6-in. Q.-F. guns in the battery, ten 3-in. on the upper deck, six 1·8-in., two Maxims, and four submerged torpedo-tubes. With natural draught and 14,000 I.H.P., the estimated speed is 18 knots. With forced draught and 18,000 I.H.P., the estimated speed is 21 knots. There are to be two 4-cylinder triple-expansion engines and water-tube boilers. The normal coal supply will be 1000 tons, sufficient for 5000 miles at 10 knots, but this can be doubled in case of need. The Regina Margherita is to be built at Venice; the Benedetto Brin is making good progress at Castellamare. New programme. Battleships.

The armoured cruiser Francesco Ferrucio, which has been laid down at Spezia, and a sister ship* which is to be built at Taranto, in external appearance and general features resemble the cruisers of the Garibaldi type. Displacement, 7,398 tons; length, 344 ft.; beam, 61 ft. 3 in.; draught, 23 ft. 4 in.; Niclausse boilers, 13,500 I.H.P.; speed, 20 knots. Protection is afforded by an armoured deck in two layers of steel, the thickness of which varies from 1·4 to 0·8 in., and by a complete belt, 6 ins. in thickness, at the water-line. The battery is protected by 6-in. armour, and by transverse bulkheads of the same thickness, thus forming an armoured redoubt. The armament comprises one 10-in gun, mounted in a barbette, with gun-house, on the bow; two 8-in. guns, also mounted in a barbette, aft; ten 6-in. Q.-F. guns in the main-deck battery; four 6-in. Q.-F. guns at the angles of the upper-deck battery, protected by shields; ten 3-in. and six 1·8-in. Q.-F., two Maxims, and four submerged torpedo-tubes within the armoured redoubt. Francesco Ferrucio.

* The new Garibaldi and Varese—building by Messrs. Ansaldo and Orlando respectively, have the same particulars as the Francesco Ferrucio.

Four destroyers of 320 tons displacement have been ordered from Schichau at Elbing, and are to be named the Lampo, Freccia, Dardo, and Strale. Two triple-expansion engines, supplied with steam by Thornycroft boilers modified, are to develop 6000 I.H.P., and give a speed of 30 knots. Four destroyers of 350 tons are building by Messrs. Pattison of Naples. The 25-knot torpedo-boat Pellicano (150 tons) is in hand at Sestri-Ponente (Odero). At Castellamare the two torpedo-cruisers Agordat and Coatit (1,313 tons), with engines of 8000 I.H.P. and Blechynden boilers, to give a speed of 23 knots, are completing.

Russia.

The large shipbuilding programme for the increase of the Russian Navy did not become public until after the publication of the *Naval Annual* for 1898. Including a grant of 90 million roubles (£9,000,000) made by ukase last year, the gross expenditure proposed upon the Navy during the seven years, 1898–1904, is 510 million roubles, or about 51 millions sterling, the shipbuilding outlay during the period being 157 million roubles. In the Navy Estimates for 1899 the sum for naval construction is put down at 34 million roubles (£3,400,000) as compared with 19 million roubles (£1,900,000) for 1898. Before dealing with the new shipbuilding programme, it will be well to describe the vessels lately completed and in hand.

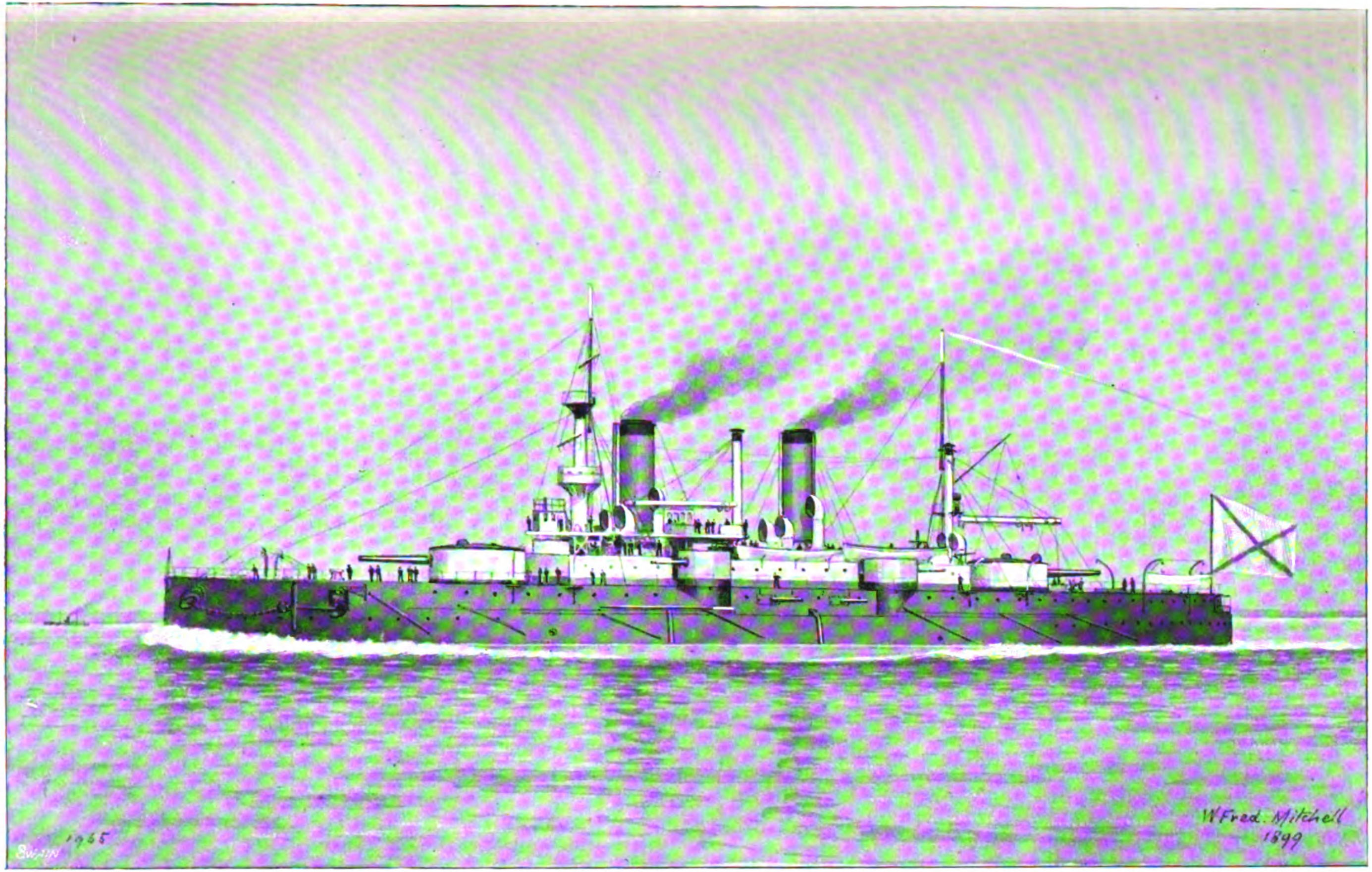
Petropavlovsk.

Particulars were given in the *Annual* last year of the trials of the Petropavlovsk. Some changes have since been made in the machinery, and the *Kronstadtski Viestnik* has published the following tabular particulars of the design, and of the conditions and results of the trials of 1897 and of October 26, 1898 (four runs on the measured mile).

	Plan.	1897.	1898.
Draught forward . .	25 ft.	23 ft. 7 in.	24 ft. 4 in.
Stern draught . . .	26 ft.	25 ft. 5 in.	26 ft. 5 in.
Mean draught . . .	25 ft. 6 in.	24 ft. 6 in.	25 ft. 4½ in.
Displacement . . .	10,960 tons	10,404 tons	10,890 tons
Mean speed . . .	16 knots	16·84 knots	16·38 knots
Engine power . . .	10,600 I.H.P.	10,416·45 I.H.P.	11,213·95 I.H.P.
Revolutions . . .	—	84	84
Steam pressure . .	—	120	120

Poltava.

The trials of the Poltava took place in September, under the supervision of a commission presided over by Rear-Admiral Hiltebrand. The 12 hours' trial began with a gentle breeze, which rose to a strong gale before the close. An opportunity was thus given of testing the seagoing qualities of the ship, as well as the steering gear, which had been under repair at the Kolpino Yard, and all passed off satisfactorily. Four runs on the measured mile gave speeds of 16·06, 16·0, 17·25, and 15·86 knots, the mean being 16·29 knots, with



"POLTAVA,"

RUSSIAN BATTLESHIP.

11,255 I.H.P. and 82 revolutions. The displacement was 11,000 tons, the draught 25 ft. forward and 26 ft. aft.

Gertzog Edinburgski. General Admiral Apraxine. Rostislav.

The Gertzog Edinburgski was under trial in August, having received a new two-winged propeller, with a diameter of 20 ft. 6 in., and 21 ft. 5¼ in. pitch, made at the steam works in Kronstadt. With 3581·5 I.H.P., pressure of 60lb. to the square inch, and 70 revolutions, a speed of 13·23 knots was attained, being 1·31 knots more than with the old screw. The trials of the coast-defence armour-clad General Admiral Apraxine on November 1 were very satisfactory, 15·07 knots being allowed as the mean of four runs on the measured mile, with 5757·4 I.H.P. (the contract being 5000 I.H.P.) and 123·5 revolutions. The second-class battleship Rostislav is said to have attained a speed of 18 knots on her trials in the Black Sea.

Peresviet and Oslabya.

The battleship Peresviet was launched at the Baltic Works on May 19, 1898. The Oslabya was launched at the New Admiralty Yard on November 8. The principal particulars of these ships are as follows: Length, 434 ft.; beam, 71 ft. 6 in.; displacement, 12,674 tons; I.H.P., 14,500; speed, 18 knots. Protection is given by a belt of Harveyed steel, 9½ ins. thick amidships, tapering to 6 ins. at the ends, and by a 2¾-in. armoured deck. The armament comprises four 10-in. guns, mounted forward and aft in barbettes, which are protected by 9-in. armour, eleven 6-in., sixteen 3-in., ten 1·8-in., and seventeen 1·4-in. Q.-F. guns, besides six torpedo-tubes. There are three triple-expansion engines, driving three propellers. With 14,500 I.H.P. and 150 revolutions, the estimated speed is 18 knots. The normal coal supply is 1060 tons, which can be increased to 2056 tons. The complement numbers 730.

Cruisers.

The armoured cruiser Gromoboi, laid down with the transport Amur on May 19, is making good progress at the Baltic yard. A description appeared in the *Naval Annual* of last year. The Diana, Aurora, and Pallada, protected cruisers of 6630 tons and 20 knots speed, are far advanced, though their completion has been delayed.

The new programme.

The new programme for the increase of the Russian Fleet includes the following vessels, of which the general features * are described below: eight battleships, one armoured cruiser, six protected cruisers of 6500 tons, ten cruisers of 3000 tons, one submarine mine transport of 6000 tons, a torpedo transport of 3000 tons, about twenty destroyers, and thirty torpedo-boats. In order to provide for the execution of this great programme it was necessary to have recourse to foreign yards. The building resources of Russia are limited, but are being extended; and there is a desire to attract foreign capital for this purpose, though in some circles great jealousy exists of this

* The Editor does not feel confident that these can in all cases be depended on.

country. The *Times* correspondent in St. Petersburg has given interesting particulars of the attitude of the Russian Government in relation to this matter.* It was proposed by the Thames Ironworks Company to spend a million sterling in establishing a large shipbuilding and engineering arsenal at Libau, on the condition of an annual subvention of 2½ per cent., or £25,000, from the Russian Government on the capital outlay, the English company undertaking in return to divide with the Government any profit above 5 per cent. Only the head of the administration and the technical men were to be English, and after ten years the Russian Government was to have the option of taking over the works on payment of the invested capital, *plus* 10 per cent. for interest and goodwill. One very important condition was the obligation undertaken by the company to build the largest vessel within the limit of one year and a half. By the recent Russian law abolishing coasting under foreign flags it was intended to encourage shipbuilding at home; but there is no spare private capital in the country and little technical skill for enterprises of this nature. The Russian Admiralty, therefore, took the proposal of the Thames Ironworks Company into serious consideration, but finally decided to decline it.

The *Kronstadtski Viestnik* has since announced that several vessels of the programme are to be built by the Russian Locomotive and Shipbuilding Company. The Ishora Works at Kolpino are also being enlarged, and will soon be in a position to supply Krupp armour-plates, Siemens-Martins steel, and water-tube boilers. Only one vessel of the new programme has been ordered in England—a destroyer, at Messrs. Laird's, Birkenhead. The others are either to be built in Russia, or in France, Germany, or the United States.

The new battle-ships.

The building of eight battleships is the principal feature of the programme. There seems to be a little doubt as to whether the Kniaz Potemkine Tavrichesky, which is in hand at Nicolaieff, and was described in the *Naval Annual* last year, really belongs to the new programme or should be regarded as anterior to it. Apart from this vessel seven battleships are in hand, ordered, or projected, six of which are to have a displacement of 12,700 tons, viz.: the Retwisan, by the Cramp Shipbuilding and Engineering Company, Philadelphia; the Pobieda (Victory) and "C," at St. Petersburg, respectively at the Baltic and New Admiralty Yards; "D," by the Russian Locomotive and Shipbuilding Company; "E," at Nicolaieff; and "F," later on at St. Petersburg; while the Tsarevitch is being built by the Forges et Chantiers de la Mediterranée at La Seyne. Of the above, only three have been commenced; and as it is reported that no unusual activity

* September 27th, 1898.

is being displayed in the shipbuilding yards at St. Petersburg, the other four ships may remain some time in the "projected" stage.

Retwisan.

The battleship Retwisan, which is in hand at Philadelphia, will have the following dimensions: length, 374 ft.; beam, 72 ft. 2 in.; mean draught, 25 ft.; displacement, 12,700 tons. The protection will consist of 9-in. Krupp steel, the belt extending for two-thirds of the length, terminated by athwart-ships bulkheads. From 10 in. to 5 in. of Krupp steel will protect the turrets, and there will be a 2 to 4-in. steel deck from stem to stern. The slopes of the deck descend to the lower edge of the belt, and the coal bunkers occupy the space between. The armament will comprise four 12-in. breech-loaders, with arcs of fire of 340 degrees, and a quick-firing battery of twelve 6-in., twenty 3-in., twenty 3-pr., and six 1-pr. guns. Two triple-expansion engines of 16,000 I.H.P., supplied with steam by twenty-four Niclausse water-tube boilers, will drive two screws and give a speed of 18 knots. The normal coal-supply will be 1016 tons, but there will be an extreme bunker capacity of 2000 tons. The double bottom will also be fitted for the storage of liquid fuel. In general features and dimensions the five other battleships of 12,700 tons will resemble the vessel which Messrs. Cramp have in hand.

Tsarevitch.

The Tsarevitch, which the Forges et Chantiers de la Mediterranée have contracted to build, will be of greater displacement—13,110 tons—and has been described by the *Yacht* as resembling the new Suffren, lately laid down at Brest. The length will be 388 ft. 8 in., the beam 75 ft. 5 in., and the mean draught 26 ft. The armament will be like that of the 12,700-ton ships, but with the addition of two 2·5-in. quick-firers, and the engines are to be of 16,300 I.H.P.

Armoured cruiser Bayan.

The new programme, so far as at present disclosed, includes no further addition to the Rossia class, and provides for but one armoured and sheathed cruiser—the Bayan—which is to be built at La Seyne. The following are the principal features: displacement, 7800 tons; length, 445 ft.; beam, 57 ft.; mean draught, 21 ft. 2 in.; armament, two 8-in. guns in turrets, and eight 6-in. quick-firers in casemates, twenty 2·9-in., and seven 1·8-in. quick-firers; Belleville boilers; engines of 16,500 I.H.P.; speed, 21 knots. The cabin bulk-heads are to be of steel and the fittings of metal. Electricity will be applied to ventilating, lighting, training turrets, raising ammunition, steering, etc.

Protected cruisers.

The protected first-class cruisers, which are to displace 6500 tons, will be six in number and will be built as follows: the Bogatyr at the Vulcan Yard, Stettin; the Waryag by the Cramp Company at Philadelphia; the Askold at the Germania Yard, Kiel; "E" at the

works of the Russian Locomotive and Shipbuilding Company; and "F" and "G" in the yard of the Franco-Belgian Company at Nicolaieff.

Bogatyr. The Bogatyr will have the following dimensions and features: length, 413 ft. 5 in.; beam, 54 ft. 5 in.; draught, 20 ft. 8 in. Armament, twelve 6-in. and twelve 3-in. quick-firers, and six 1·4-in. Hotchkiss. Protection, 5 in. of nickel steel on the chief gun-positions, and a 2¾-in. deck. There are two sets of triple-expansion four-cylinder engines, and Normand water-tube boilers, all built at the Vulcan Works. I.H.P., 19,500; speed, 23 knots; coal capacity, 720–1100 tons; complement, 580.

Waryag. The cruiser Waryag, which Messrs. Cramp have in hand, generally resembles the Bogatyr, but the length between perpendiculars is 420 ft., the beam 52 ft., and the mean draught 19 ft. 6 in. The armament will be the same. The protective deck, which will run from stem to stern, will be 1½ in. thick on the flat and 3 in. thick on the slopes. Eight of the 6-in. guns will be mounted on the main deck, the two forward and the two after guns on either side on sponsons, permitting direct ahead and astern fire. All will have very considerable arcs of fire. The four remaining 6-in. guns will be mounted two each on the forecastle and on the main deck abaft the after bridge. These guns, like the eight guns amidships, will be well protected by heavy shields. This disposition of the 6-in. guns affords a bow and a stern fire of four pieces, and a broadside fire of six. The twelve 3-in. guns will be on the main and berth decks, eight of them amidships between the broadside battery of 6-in. guns. Two others will be well forward on sponsons, just under the forecastle, and the last two mounted on sponsons, one on either side, well aft on the berth deck. The small guns will be on the bridges and in the tops. Thirty Niclausse water-tube boilers and engines of 20,000 I.H.P. are to give a speed of 23 knots. The coal-supply is 770 tons, which can be increased to 1250 tons, and will be stowed so as to augment the protection to the engines and the boilers. The ship will be lighted by electricity, which will also be used for the production of power in many directions.

Askold. According to particulars received of the Askold, which is in hand at the Germania Yard, Kiel, she will differ somewhat from her sisters, the dimensions being: displacement, 6,000 tons; length, 426 ft. 6 in.; beam, 49 ft. 3 in.; draught, 20 ft. 4 in.; engines, 19,000 I.H.P.; normal coal supply, 710 tons. The armament will be the same, and the torpedo equipment will be 4 above-water tubes at the bows, stern, and on the broadsides, and a submerged tube on each broadside.

The ten second-class cruisers of 3000 tons included in the new programme have not all been put in hand. Herr Schichau is building the Novik at Elbing (347 ft. 10 in. long, 40 ft. beam, 25 knots), and two or more of the class will be constructed by the Russian Locomotive and Shipbuilding Company, St. Petersburg. These vessels will be generally of the type of the Svietlana, built at Havre. Second-class cruisers.

Messrs. Creighton are to put in hand two torpedo-gunboats of the Abrek type. They have completed the Krechet and Korshun, destroyers of the Sokol class, and the Ishora yard four of the same type, Condor, Iastreb, Nyrok and Berkout. Three other vessels of the same class have been begun at Ishora, and Messrs. Creighton are also to build others. In England Messrs. Laird are building the Som, of 350 tons, at Birkenhead; in France, M. Normand has in hand the destroyers Forel and Sterliad at Havre, and the Forges et Chantiers de la Mediterranée the Ossetr, Kephal and Losos at La Seyne (312 tons); and in Germany Herr Schichau is constructing the Kit, Skat, Delphin and Kassatka, of 350 tons, at Elbing. Four other destroyers of the Sokol class, building or to be built at the Nevsky yard, have been named the Gagara, Voron, Filin and Sova. Torpedo craft.

The Ermach, a powerful ice-breaker for the Baltic, has just been completed at Elswick.

United States.

The inclusion in this volume of a special chapter on the United States Navy, by Lieut.-Commander Beehler, makes it unnecessary to deal with the subject at great length here. No less than five battleships have been launched during the past year: the Kearsarge and Kentucky at Newport News, on March 24, 1898; the Alabama at Messrs. Cramp's yard, Philadelphia, on May 18; the Illinois at Newport News, on October 4; and the Wisconsin at San Francisco, on November 26. These ships have already been described in the *Naval Annual*, or are described in Chapter V. Battleships launched.

The New Orleans, built at Elswick for Brazil and originally named Amazonas, which was bought just before war with Spain was declared for the sum of £293,684, is thus criticised in the *Army and Navy Journal*:—"She is in many respects very different from our cruisers, being a sheathed teak and copper-bolted vessel, the only one of this class under Admiral Sampson. Her battery is formidable and superior, probably, gun for gun to that of our ships mounting the same number. Her 6-in. gun-mounts are better than ours, The Elswick cruisers.

increasing the rapidity and effectiveness of her fire, but aside from this the guns possess no other advantage. She carries six 6-in. Q.-F., four 4·7-in. Q.-F., ten 6-prs., four 3-prs., four Maxims, three 37-mm., 5-barrel machine-guns, and two 12-pr. field-guns. In addition she carries three torpedo-tubes, one in the bow and one on each side forward. She has electrical ammunition hoists, and the entire electric plant of the ship is in the engine room and in charge of the engineer's force. With these advantages the New Orleans has the disadvantage of being built on a low free-board plan, and in heavy weather is a wet ship. Her defects and deficiencies will be corrected as far as practicable in her sister ship, the Albany, which was bought at the same time in an incomplete condition. She is unquestionably a fine addition to the naval service and has some strong points, but not enough to place her far ahead of any ship of her displacement and class constructed in this country. Her performance has been necessarily better than our own ships could reach from the fact that she fired smokeless powder, but while our persistence in using an inferior explosive is proof of foolish conservatism, it does not necessarily prove inferiority in other respects."

The sister cruiser Albany (ex Abreu) was launched at Elswick on January 14, 1899. On the occasion Lieut. Colwell, United States naval attaché, drawing attention to the fact that the two vessels were the first American warships built abroad, said that if the Albany did as well as the New Orleans nothing better would be asked. He added that the guns of the New Orleans were admittedly better than any of the American guns, and that the Americans were to build their guns on the same model. The contract sum to be paid for the Albany is £247,611.

Torpedo craft.

The Dahlgren, Craven, Farragut, Rowan, Davis, Fox and Mackenzie, all, except the last, which is much smaller, ranging between 132 and 273 tons, have been delivered by their builders, and the Bailey (235 tons) and Goldsborough (247 tons) are to be ready during the summer. In addition to these thirty others have been ordered, and may have been laid down. The Farragut, Bailey and Goldsborough (30 knots) are really destroyers, but the new destroyers will displace 420 and 433 tons, with 29 and 20 knots speed. The submarine boat Plunger is at a standstill at Baltimore.

Captured vessels.

The cruisers Isla de Cuba and Isla de Luzon (1030 tons), launched at Elswick in 1887, and the Don Juan de Austria, of the same class, built at Cartagena, which were among the vessels sunk at Manila, May 1, 1898, were refloated under the superintendence of Constructor Capps, and are being repaired and refitted for service by the Hong-Kong and Whampoa Dock Company. The gunboats Callao and

Leyte, the torpedo-boat Barcelo, and some other vessels, were captured in the Philippines. The Reina Mercedes (3090 tons), sunk at the mouth of Santiago Harbour, has been refloated with the intention of fitting her for service. A number of modern gunboats, mostly built at Clydebank specially for services in Cuban water, were captured by Admiral Sampson, and of these the Alvarado and Sandoval have been added to the North Atlantic Squadron. At the outbreak of the war a large number of merchant and passenger vessels were purchased or hired, and a list of those retained will be found with the tables of the United States Navy.

On December 14 the battleship Massachusetts entering New York Harbour ran upon the Diamond Shoal and received serious damage through the destruction of a considerable length of her side plating. The necessary repairs involved an outlay of $40,000. In his sixth article upon "The War on the Sea and its Lessons" (*Times*, February 2), Captain Mahan cited this mishap as a concrete example to illustrate his thesis that ships should not be opposed to forts, suggesting how serious might be the effect of the disablement even of a single vessel in time of war. **Accident to the Massachusetts.**

Three new battleships, the Maine, Missouri, and Ohio, were provided in the Act of May 4, 1898. They are of 11,500 tons displacement, and are fully described by Lieut.-Commander Beehler. The new shipbuilding programme also included **Programme of 1898.**

4 coast-defence monitors,
3 second-class cruisers,
6 third-class cruisers,
16 torpedo-boat destroyers,
12 torpedo-boats,

of which particulars will be found in Chapter IV.

Congress has given authority for the construction, at a cost of over £10,000,000, of three battleships of 13,500 tons, three armoured cruisers of 12,500 tons, and six protected cruisers of 2500 tons. **New programme.**

Japan.

Nothing has been more remarkable during the last few years than the rise of Japan to the rank of one of the leading naval powers. The new shipbuilding programme, of which we gave particulars last year, included four battleships, six first-class and three second-class cruisers, besides smaller vessels. This programme has been pressed forward with great vigour.

The battleship Shikishima, which was laid down at the Thames **Battleships.**

Ironworks in March, 1897, was launched on November 1, 1898. Displacement, 14,850 tons; I.H.P., 14,500; speed 18·5 knots. The armament includes four 12-in. guns in barbettes and fourteen 6-in. Q.-F. guns, all mounted in casemates. In general design the Shikishima resembles our Majestic class. A full description has been given of her in previous editions of the *Naval Annual*, and a plate will be found in Part II.

The other three battleships are of the same class. The Hatsuse is building at Elswick, another has been ordered from Messrs. Vickers, at Barrow, and the third, the Asahi, has been launched at Clydebank.

The following are the dimensions of the Hatsuse. Length, 400 ft.; beam, 76 ft. 6 in.; draught, 27 ft.; displacement, 15,000 tons. The minor armament includes eight 3-prs. and four 2½-prs. In most other particulars the Hatsuse resembles the Shikishima.

The battleship building at Barrow, on the other hand, differs from the Shikishima in the system of protection adopted for the secondary armament.* Ten of the 6-in. Q.-F. guns are mounted in a maindeck battery, protected by 6-in. armour, the guns being isolated by screens.

First-class cruisers. Asama.

Of the first-class cruisers, the Asama was launched at Elswick on March 22, 1898. Displacement, 9750 tons; length, 408 ft.; beam, 67 ft.; mean draught, 24 ft. 3 in. The armament comprises four 8-in. Q.-F. guns, mounted in barbettes of 6-in. armour with gun-houses; fourteen 6-in. Q.-F. guns, ten of which are mounted in casemates protected by 6-in. nickel steel, and four on the upper deck amidships, with 6-in. shields. She carries besides twelve 12-pdr. and seven 3-pdr. Q.-F. guns, and five torpedo-tubes, four of which are submerged. She is protected by a belt of 7-in. Harveyed steel, 7 ft. deep, viz., 2 ft. above and 5 ft. below the water-line; this belt tapers to 3½ in. at the ends of the vessel. Above the 7-in. belt is another of 5-in. thickness, which reaches beyond the turrets at either end, and is then bent inwards and across, forming complete athwartship bulkheads, protecting the bases of the turrets and generally shielding the vessel against raking projectiles; a belt of 6-in. plating which extends 25 ft. aft from the stem on either side protects the bow torpedo-tube. The Asama is supplied with four under-water torpedo-tubes in addition to the one above water forward, and all are intended for torpedoes of 18-in. calibre. The main deck is in two thicknesses, each of ½-in. steel, and the ammunition hoists, where they rise above the belts, are circular tubes of 3-in. steel. The upper deck is covered with teak, and this is practically the only woodwork that cannot be disposed of in case of action or fire. The fire-main is completely under the armoured deck and has risers at intervals, each with its own valve,

* Cf. Plate in Part II.

thus guarding against the accidents which occurred in the Spanish ships at Santiago, from the destruction of their fire-mains. The bulkheads are of steel and the doors and cabin fittings alone are of wood.

The Asama made her trials off the Tyne in February. During six hours at full power of natural draught, with open stokeholds, the horse-power developed was rather over 13,000, giving 140 to 142 revolutions per minute, and a speed averaging 20·37 knots. In the forced-draught trials, with a moderate sea but a strong beam wind off the land, the engines worked up to 19,000 horse-power, with 158 revolutions and a mean speed for the vessel of 22·07 knots. The engines, manufactured by Messrs. Humphrys and Tennant, worked absolutely smoothly. They are supplied with steam from cylindrical boilers placed back to back and stoked from the wings, and they give 13,000 horse-power without forced draught and 18,000 with 2 in. of air pressure. Normal coal supply, 600 tons; bunkers full, 1200 tons. The guaranteed speeds are twenty knots at the lower and 21¼ at the higher power. During the gun trials, with full charges, both pairs of 8-in. guns were fired directly either ahead or astern with five degrees elevation and no injury was done. The four 6-in. guns forward were fired simultaneously, and also those aft, the boats, woodwork, and other fittings of the vessel being uninjured.

Tokiwa, etc. The Tokiwa, sister-ship to the above, was launched at Elswick on July 6. Two other first-class cruisers are under construction at Elswick. Length, 400 ft.; beam, 68 ft. 6 in.; draught, 24 ft. 3 in.; displacement, 9750 tons; I.H.P., 14,500; speed, 20¾ knots. The normal coal-supply is 600 tons, and with bunkers full 1400 tons; the complement is 676. The protection and armament are practically the same as in the Asama, described above. The Yakumo, which is being built at Stettin, and the Azuma, building at Rochefort, differ slightly in dimensions from the vessels under construction at Elswick.

Second-class cruisers. Of the second-class cruisers, the Kasagi, built by Messrs. Cramp at Philadelphia, has had her armament fitted at Elswick. The following are the principal particulars of the vessel: displacement, 5416 tons; length between perpendiculars, 393 ft. 6 in.; beam, 48 ft. 9 in.; draught, 19 ft.; I.H.P., 15,797; grate surface 920, and heating surface 26,000 sq. feet. On some preliminary trials, before crossing the Atlantic, the Kasagi attained a speed of 22·75 knots. It is reported that the Chitose, which is completing at San Francisco, will also come to Elswick to receive her armament. She is said to differ in dimensions from her sister the Kasagi. The following particulars are from the *Marine Review* (Cleveland, Ohio):—Displacement, 4760 tons; length between the perpendiculars, 376 ft. 5 in.; beam, 49 ft.; draught, 17 ft. 7 in.; I.H.P., 15,500;

grate area 792, and heating surface 22,000 sq. ft. The Chitose has 12 single-ended cylindrical four-furnace boilers, with a working pressure of 155 lb.

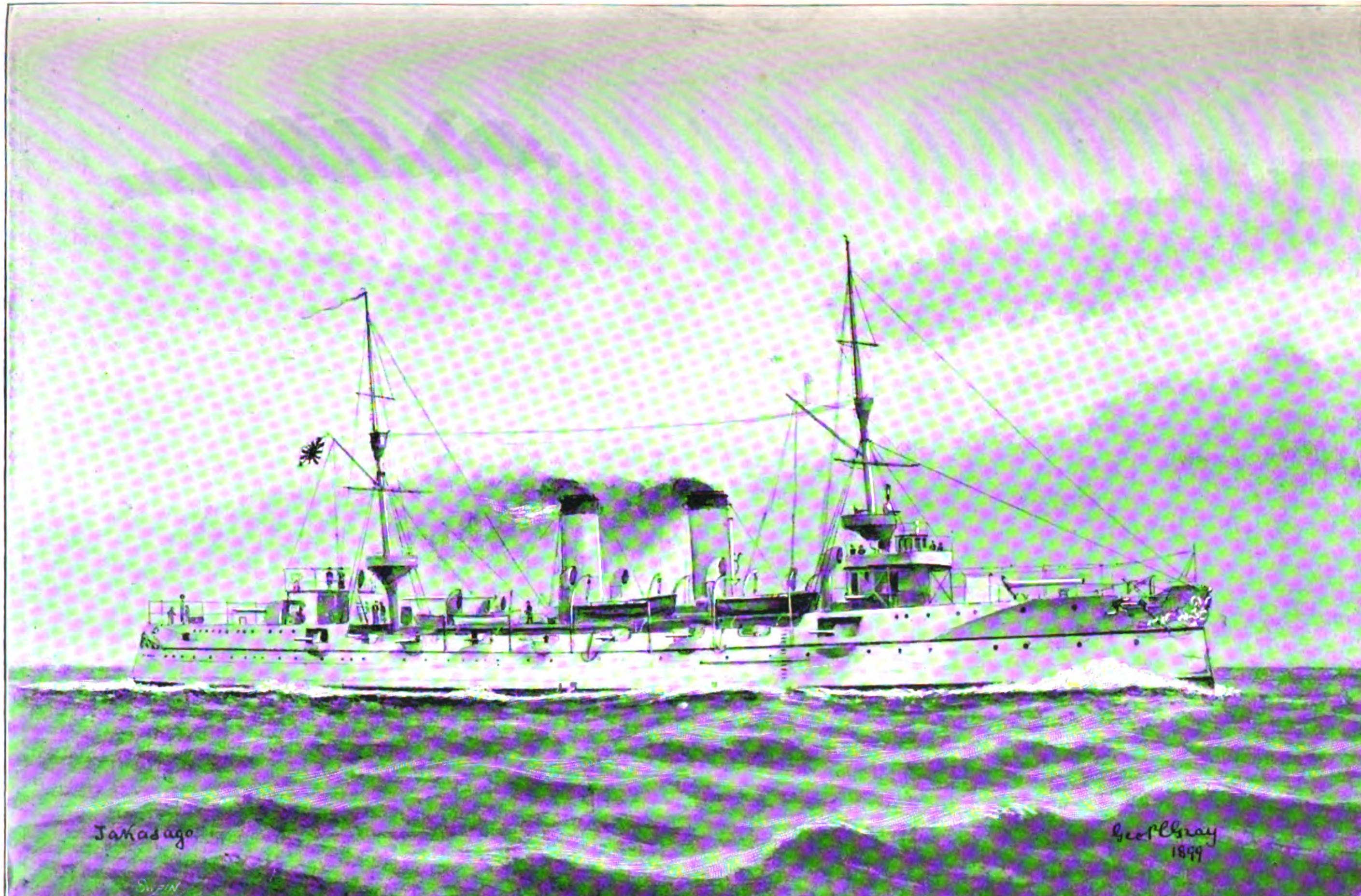
Takasago. The Takasago, of 4160 tons, has been completed. With her speed of 24 knots and her powerful armament, she is a very remarkable vessel, a worthy successor of other cruisers designed by the able hands of Mr. Watts, and merits a somewhat longer description than has already been given of her in these pages. The following is condensed from the *Army and Navy Gazette*. It may be premised that the armament of the cruiser consists of 2 8-in., 10 4·7-in., 12 12-pdr. and 6 2½-pdr. quick-firers, with 5 torpedo-tubes.

"For a second-class cruiser the Takasago is very high out of the water. She has a raised poop and forecastle on which the 8-in quick-firers are carried, protected by large shields, 4½ ins. thick in front, and 2 ins. thick at the sides. These raised decks cover in the fore and aft 4·7-in. sponsons. The remaining 4·7-in. guns are distributed amidships behind low bulwarks cut away in embrasures sufficient to give a large arc of training, about 150 deg. All these 4·7-in. guns are long pieces with the usual Elswick shield about 2 ins. thick in front. The 3-in. 12-pdrs. are also fitted with gun shields of the same shape. These guns are carried, two on the forecastle above the forward sponsons, two inside the forecastle right forward, two on the poop above the after 4·7-in. sponsons, two inside right aft, and the rest between the 4·7-in. guns. The 2½-pdrs. are carried a couple in each fighting top, and two amidships. These last embody a Japanese invention for rapid closing of the breech. On the top of each breech-piece on the right-hand side there is a thick leather pad, a blow of the hand on which instantly brings up the breech-block. As the breech is opened automatically by the recoil of firing two men can easily manage the gun, and a single man if he had the ammunition handy could maintain a very respectable rate of fire. These 2½-pdrs. have hooded shields, miniatures of those on the 4·7-in. and 3-in. guns. It is worthy of especial note that the Takasago's fighting tops, like the Yoshino's, are low. After the Yalu an impression gained ground that the low fighting top was very likely to be hit in action. Stability would be impaired, of course, were they higher, but at the same time the matter is worthy of comment.

"The conning-tower is 4½-in. Harveyed nickel, and is surmounted by a bridge. There is also an after bridge. A fore and aft bridge runs along the port side from poop to forecastle.

"The torpedo-tubes are five in number, one fixed tube in the bow, and training tubes on the beam and quarter. There is no stern-tube.

"The armoured deck is 4½ ins. thick at the slopes, 2½ ins. on the flat



"TAKASAGO"

JAPANESE CRUISER.

top. Like the 8-in. gun shields, it may be regarded as proof against armour-plated shot from an 8-in. gun.

"The lower deck is of steel covered thickly with linoleum, in order to avoid the risk of fire in a part where fires are most dangerous and difficult to deal with in action. There is, however, none of that total abolition of wood so characteristic of the latest German ships. The upper deck is, as usual, composed of wood; the Japanese prefer this, holding that a complete wooden deck gives a rigidity far superior to steel, and that fires here are so easily dealt with that the extra risk need not be seriously considered.

"There are two sets of vertical triple-expansion engines, and eight boilers, four of them double-ended. The horse-power is 15,000, the trial speed over 23 knots. The sea-speed is 21 knots. 1000 tons of coal can be carried, but the normal coal capacity is about 800 tons. The ship, according to her officers, is a roller, as might be expected. She pitches very little indeed."

A second-class cruiser of the Takasago class is in hand at Elswick. The only material difference is in the armament, there being sixteen 3-pdr. instead of twelve 12-pdr., and six 1-pdr. instead of six 2½-pdr. These particulars were given by the *Times* in an account of the Elswick Works on October 11, 1898.

Over twenty destroyers were included in the new shipbuilding programme. Six of these are being built by Messrs. Yarrow. The following description is taken from the *Times*, December 16, 1898:— **Destroyers.**

"The Ikadsuchi (Thunder), the first of six torpedo-boat destroyers built for the Japanese Navy by Messrs. Yarrow and Company (Limited), of Poplar, ran a preliminary trial yesterday on the Maplin measured mile. The vessel is 220 ft. long and 20 ft. 6 in. in breadth, and is of the usual design built by this firm, excepting that she has the officers' accommodation amidships in place of being aft, as in English vessels of the class. Her machinery consists of two sets of four-cylinder triple-expansion engines, with cylinders 20½ ins., 31½ ins., and two of 34 ins. in diameter, with an 18-in. stroke. They are designed to develop 6000 I.H.P., but are capable of giving power up to about 7000 I.H.P. if needed. There are four boilers of the Yarrow straight-tube type, and as these are each capable of supplying steam for over 1500 horse-power they are of exceptional size; in fact they are the largest of the Yarrow type yet tried. The contract speed is 31 knots, and the load to be carried is 35 tons. On yesterday's trial the full load and seventy-eight persons, all told, were on board. The mean speed on the measured mile was over 31 knots, the steam pressure averaging 185 lb. to the square inch on both engines, the vacuum 25 ins., and the revolutions averaging just over 400 per

minute. The mean draught was 8 ft. 6 in. The armament consists of one 12-pdr. Q.-F. gun mounted aft and five 6-pdr. guns on the broadside. There are two swivelling torpedo-tubes aft for 18-in. torpedoes, and there is stowage for six 18-in. torpedoes. The coal capacity is 90 tons."

The Inadsuma, the second of Messrs. Yarrow's boats, was launched on January 28, 1899, and the Akebono, Suzanami, Oboro, and Niji are in hand.

Six destroyers are building at Messrs. Thornycroft's Yard, Chiswick, and have received the following poetical names—Shinonome (Daybreak), Murakumo (Darkening Clouds), Yugiri (Evening Mist), Shiranui (Will o' the Wisp). The guaranteed speed is 30 knots with a load of 35 tons. The Murakumo and Shinonome obtained a speed of 30·229 knots, and the Yugiri of 30·15 knots for three hours' continuous steaming. Two destroyers more recently commenced at Thornycroft's are named the Kagero and Usugumo. The four building at Havre by Messrs. Normand will be named the Hayabusa, Kasasagi, Managuru, and Shirabaka. Herr Schichau also has four torpedo-boats in hand.

II.

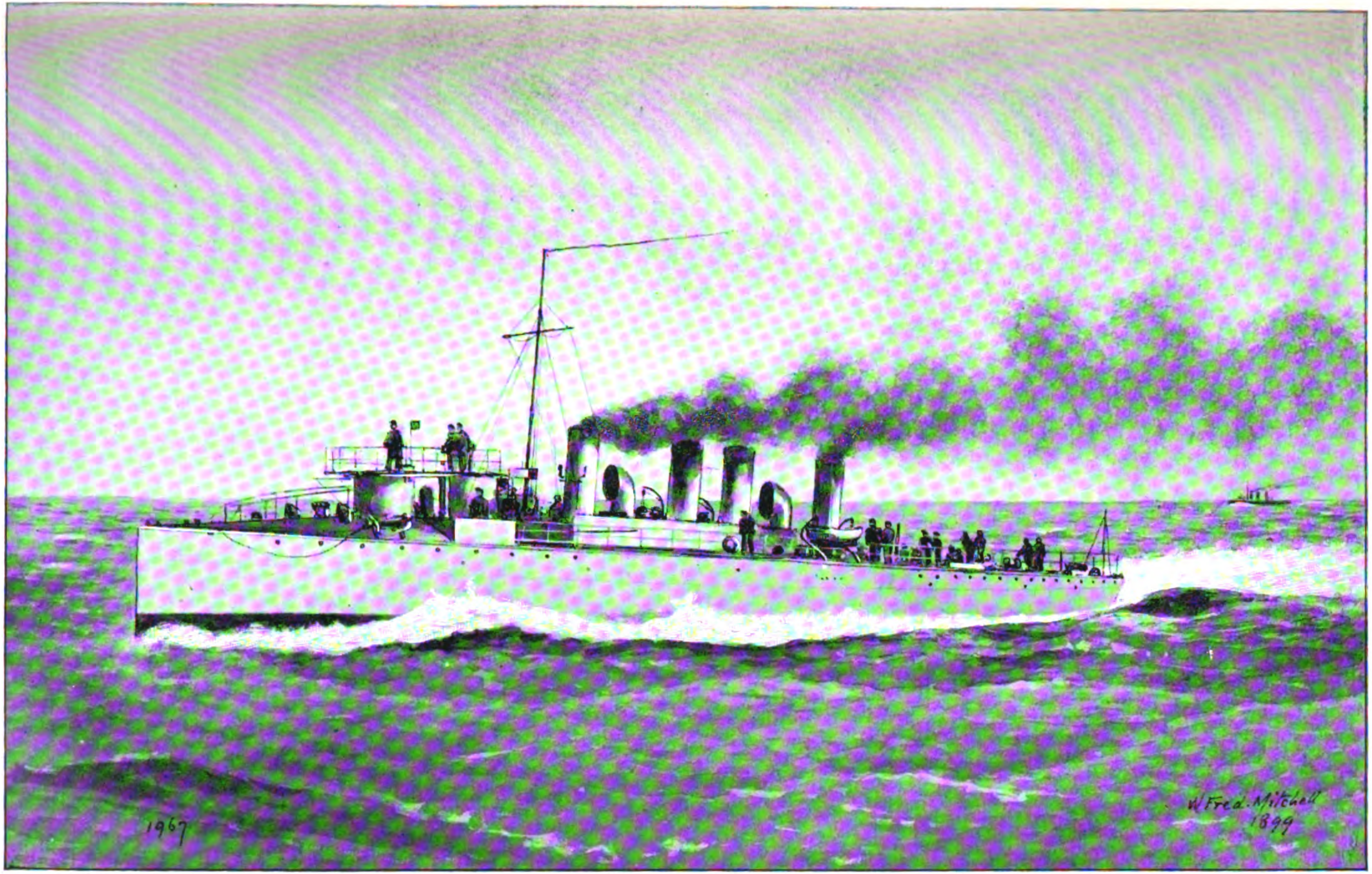
MINOR NAVIES.

Argentine Republic.

General Belgrano.

The armoured cruiser General Belgrano (ex-Varese) has been delivered by Orlando Bros., of Leghorn. She was laid down in June 1896, and launched in July 1897. She is of the same type as the General San Martin and the Garibaldi (now refitting at Genoa),* which were laid down for the Italian Government, and purchased by the Argentines while building. The type has been already described in these pages. We may recall the principal particulars. Displacement, 6882 tons; length, 328 ft.; beam, 59 ft. 8 in.; mean draught, 24 ft. Protection is afforded by a complete water-line belt of nickel steel of a maximum thickness of 6 ins., by transverse bulkheads also 6 ins. thick, and by a deck of a maximum thickness of 1½ ins. The armament comprises two 10-in. Armstrong guns, mounted in barbettes on the forecastle and poop, ten 6-in. Q.-F. guns in the battery, two 14-pounder guns on the upper deck, ten 2·2-in. Hotchkiss, eight 1·4-in. Maxims, two-machine guns, and two field-guns, with four submerged torpedo-tubes. The machinery consists of two triple-expansion engines, and eight cylindrical single-ended boilers, with

* Her main armament was not on board March 16th.—Ed.



"IKADSUCHI,"

JAPANESE TORPEDO-BOAT DESTROYER.

Fox corrugated furnaces. I.H.P. with natural draught 8600, with forced draught 13,000. On the natural draught trials a speed of 18·09 knots was obtained, with ninety-two revolutions. The forced draught speed was over 20 knots.

San Martin. The General San Martin, after being completed at Messrs. Orlando's yard at Leghorn, attained a speed of 18 knots with 8286 I.H.P. under natural draught, and 19·68 knots with 12,436 I.H.P. and 1 in. air pressure. The armament comprises four 8-in., ten 6-in., six 4·7-in., twelve 2·2-in., and ten 1·4-in. quick-firers. The San Martin left for South America in May, 1898.

Pueyrredon. The Pueyrredon, of the same class, has been launched at Messrs. Ansaldo's yard. Her armament is like that of the Garibaldi: 2 10-in., 10 6-in. Q.-F., 6 4·7-in., and 20 smaller.

Almirante Brown. The Almirante Brown has returned to South America, after her refit at St. Nazaire. Displacement, 4267 tons; I.H.P., 5400; speed, 13·75 knots. Her new armament consists of ten 5·9-in. Canet Q.-F. guns, six in the battery, two on the forecastle, and two on the upper deck aft, the latter replacing the four 4·7-in. Q.-F. guns, which have been removed to either end of the battery.

The training ship, President Sarmiento, of 2750 tons displacement, has been completed at Messrs. Lairds', and obtained on her trial a speed of 13½ knots, being half a knot more than the contract speed

Messrs. Yarrow have in hand a torpedo-destroyer, in which will be placed the engines of the destroyer, Santa Fé, which was lost on the Colonia Reef in 1897, shortly after having been delivered by the builders.

The Barcelona (4020 tons register), and Cadiz (4218 tons), have been purchased from the Spanish firm of Pinillos, Saenz and Co., and have received the names of Pampa and Gaucho. The Arno (3403 tons register), Regina Margherita (3577 tons), and Sempione, of the Florio and Rubattino line, have also been purchased. These vessels are to be transformed into cruisers.

Austria-Hungary.

A good deal of attention was directed to the Austrian Navy at the time of the discussion of the ministerial policy by the Budget Committee of the Hungarian Parliamentary Delegation in May, 1898. Baron von Spaun, chief of the Naval Department, insisted upon the modest nature of the building scheme, and upon the unexpansive character of the fleet, in which, as he pointed out, many vessels are valueless and should be replaced. No one in the Navy, he said,

dreamed of a colonial policy, and the sole object of the government was the defence of the coast. The programme included, he explained, six armourclads, with cruisers and monitors for the Danube, and forty-six torpedo-boats. In the result, the Hungarian Delegation agreed to the proposals of the year, but declined to regard them as the starting point of a large programme.

Progress in 1898.

The Budget of 1898 provided for the continuation of work upon the torpedo-cruiser Zenta, 2250 tons, and upon a sister vessel, "B," respectively, to replace the Grief and Helgoland, as also upon the coast-defençe armourclads Wien and Budapest (which are now ready for service), the ram-cruiser "D" (now Kaiser Karl VI.), and six sea-going torpedo-boats. There was also provision for work at Teodo, which is a coaling and torpedo station, for defensive works in the Valle Vergarolla, for improvements in the arsenal at Vallelunga and the mining establishment at Fisella, and for other works ashore, which are being further continued under the Budget of 1899.

Kaiser Karl VI.

The Zenta class of torpedo-cruisers was described in the *Annual* last year, which also gave full particulars of the trials of the three coast-defence armourclads. The armoured cruiser Kaiser Karl VI. (*ex* "D") was launched at Trieste on October 4th. Displacement, 6250 tons; length, 367 ft. 6 in. between the perpendiculars; beam, 56 ft.; draught, 20 ft. 4 in. Protection is afforded by a Harvey steel belt of a maximum thickness of 10·6 ins. (with transverse bulkheads), above which is light armour 2½ ins. to 1¼ ins. in thickness. The armament consists of two 9·4-in. Krupp Q.-F. guns, carried in barbettes protected by 9·8-in. H.S. armour, eight 5·9-in. and eighteen smaller Q.-F. guns, with two machine-guns and torpedo-tubes. The ship has Belleville boilers, and with 12,800 I.H.P. the speed is expected to be 20 knots. The coal capacity is 790 tons.

Destroyers.

The four torpedo-boats of the Viper type, ordered from Messrs. Yarrow last year, are 152 ft. 6 in. long by 15 ft. 2 in. beam. The armament consists of three pivoted torpedo-tubes for 18-in. torpedoes, two forward and one aft, and two 3-pdr. quick-firers. The Viper, with a load of 26 tons, reached a speed of 26½ knots. The guaranteed speed of the new boats, which have been named the Boa, Cobra, Kigyo, and Python, was 24 knots, carrying a load of 40 tons. Three of these have been tried, all practically agreeing as to the result, viz.:—345 revolutions, 1800 I.H.P., speed 24·3 knots.

Programme of 1899.

The Naval Budget of 1899 amounts to 11,095,260 fl. (£1,086,410) for ordinary expenditure, and to 5,746,000 fl. (£562,635) for the extraordinary expenditure, being an increase (taking account of a supplementary credit for 1898) of 2,360,000 fl. (£231,085) as compared with the naval outlay last year. Further provision is made

for all the vessels included in the programme of 1898, and also for laying down another torpedo-cruiser, "C," of the Zenta class enlarged (2350 tons), to replace the Fasana, as well as a coast-defence armourclad, "I," of 7800 tons, and a battleship, "II," of about 8000 tons. The design of these, however, has not been settled, but they will probably be of the same class. It has been reported that they will have water-tube boilers and engines of 11,000 I.H.P., intended for a speed of 18 knots, and an armament of three 9·4-in., twelve 5·9-in., and twenty-four smaller Q.-F. guns.

Brazil.

The coast defence turret-ship Marshal Deodoro, was launched at La Seyne on June 18. Displacement, 3162 tons; I.H.P., 3400; speed, 15 knots. She was described in the *Naval Annual* for 1897.

The torpedo-cruiser Tamoyo (1038 tons), a sister ship of the Caramuru, Timbira, and Tupy, was launched at the Germania Yard, Kiel, on May 26.

Bulgaria.

The torpedo-gunboat Nadièzda, built by the Ateliers et Chantiers de la Gironde, at Bordeaux, was launched on September 24. Displacement, 715 tons; length, 219 ft. 6 in.; beam, 27 ft. 6 in.; draught, 12 ft. 6 in.; armament, two 3·9-in. and three 1·8-in. quick-firers, and two torpedo-tubes; engines of 2600 I.H.P., with two Lagrafel and d'Allest boilers, intended for a speed of 17 knots. **Nadièzda.**

Chili.

The armoured cruiser Admiral O'Higgins, of which a full description was given last year, has been completed. With 10,000 horse-power and 80 to 85 revolutions, she attained a speed of 19 knots. With 16,000 horse-power and 160 revolutions a speed of 21¾ knots was reached. Some further considerations with regard to this powerful cruiser will be found in another chapter.

The training-ship General Baquedano was launched at Elswick on July 5. Length, 240 ft.; beam, 45 ft. 9 in.; mean draught, 18 ft.; displacement, 2330 tons. Armament, four 4·7-in., two 12-pdr., and two 6-pdr. Q.-F. guns, two Maxims, one torpedo-tube. Speed, 13 knots, with 2500 I.H.P. Coal supply (normal), 200 tons; with bunkers full, 330 tons; complement, 280.

Two destroyers and two torpedo-boats have been launched at Balcachuano, where a yard for the building of torpedo craft has been established. The destroyers are named Capitan Thompson and Teniente Rodriguez. They are of the class of the Capitan Orella, built at Birkenhead, and have a displacement of 3000 tons. With 6000 I.H.P. the estimated speed is 30 knots. The torpedo-boats are named the Ingeniero Mutilla and Guardiamarina Contreras. They have a displacement of 130 tons, and are to steam at 25½ knots. Some other torpedo-boats are in hand.

China.

Protected cruisers.

Particulars were given in the *Annual* last year of the protected cruisers Hai Tien and Hai-Chi, now completing on the Tyne. The three protected cruisers, Hai Yung, Hai Shen, and Hai Shew, have been completed at the Vulcan Yard at Stettin and have sailed for China. Displacement, 2950 tons; speed, 19½ knots. They were described last year.

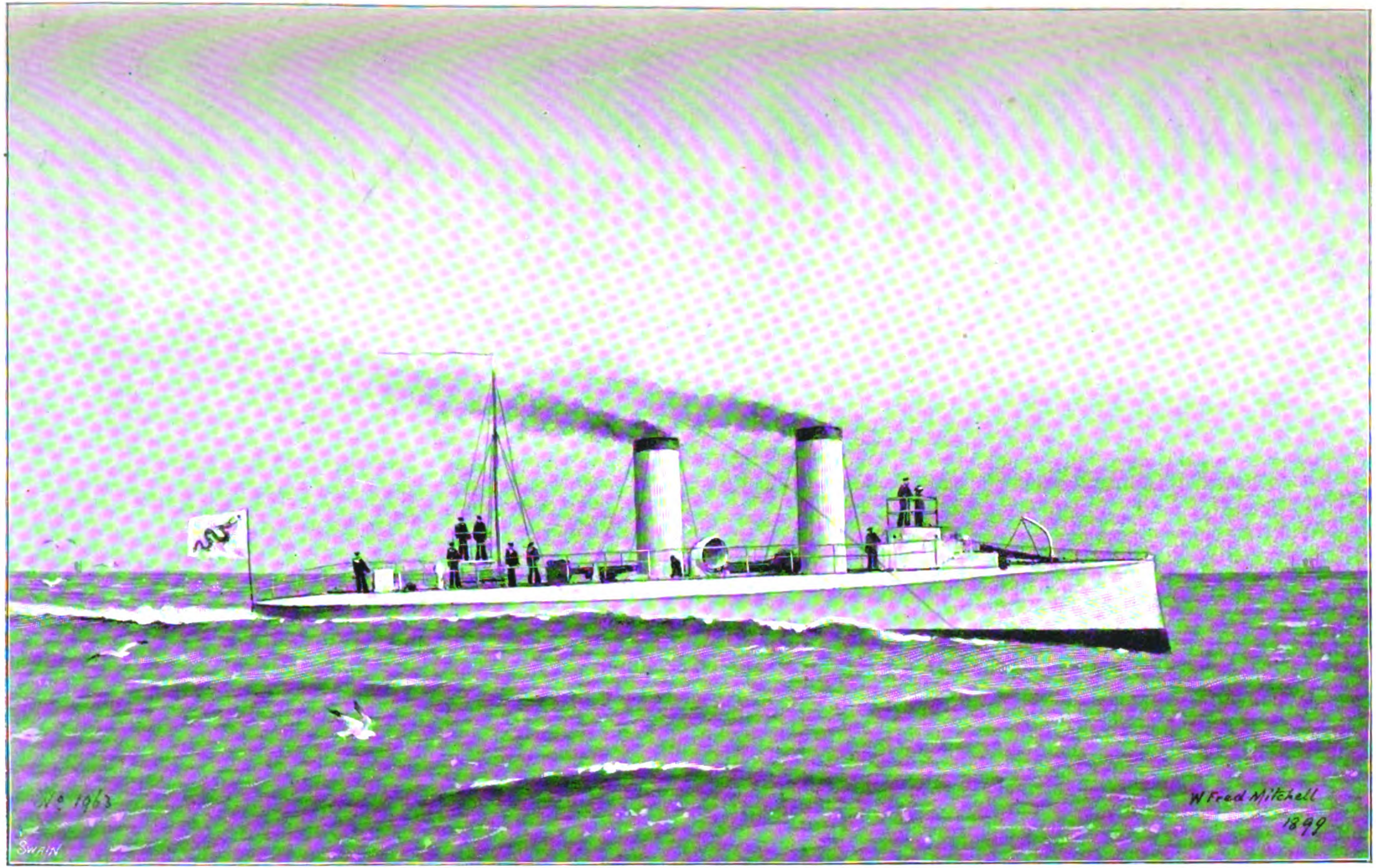
Torpedo craft.

The four fast torpedo-boat destroyers, Hai Lung, Hai Niu, Hai Ching, and Hai Hoha, completing at Herr Schichau's Yard, Elbing, displace 280 tons, are 193 ft. 7 in. in length by 21 ft. beam, and have engines of 6000 horse-power, which are guaranteed to produce a speed of 32 knots. The Hai Lung on the run between Pillau and Brüsterort is reported by Herr Schichau to have attained a mean speed of 35·2 knots, with a load of 25 tons. With a load of 67 tons the boats are said to have attained a speed of between 33 and 34 knots with forced draught, and between 30 and 31 knots with natural draught.

Work at Foochow.

Two torpedo-gunboats and a torpedo-boat have been laid down at Foochow Arsenal, now under the direction of M. Doyère who has designed these vessels. The following are particulars of the torpedo gunboats: length between the perpendiculars, 255 ft. 10 in., extreme, 260 ft.; beam, 26 ft. 9 in.; draught, 10 ft. 6 in.; displacement, 871 tons; I.H.P., 7000; estimated speed, 23 knots. The Schneider-Canet quick-firing armament will include one 3·9-in. gun forward, three 2·5-in., and six 1·4-in, and there will be two torpedo-tubes; the machinery to be supplied by the Forges et Chantiers de la Méditerranée. The torpedo-boat will displace 30 tons, with a length of 88 ft. 6 in. and engines of 550 I.H.P., supplied by a Leblond-Coville boiler—the machinery built at Cherbourg—to give a speed of 20·5 knots.

The reorganisation of the Foochow Dockyard under European supervision was forced upon China as a result of the war with Japan.



CHINESE TORPEDO-BOAT DESTROYER.

"SCHICHAU" TYPE.

The various constructive establishments, both naval and military, throughout the empire, though created at a vast outlay of money and provided with the best appliances, have fallen into a deplorable state, and waste and incompetence are everywhere apparent. Thus when Lord Charles Beresford visited the arsenal at Wuchang, according to the correspondent of the *Times*, the establishment presented an example of the appalling waste and absence of organisation invariably to be met with in enterprises controlled by native officials. Thousands of pounds' worth of machinery was lying idle. Like conditions existed at Nanking, where splendid machinery was in rapid process of deterioration and was being used for the production of obsolete "jingals."

Denmark.

The Budget for 1899–1900 amounts to £386,370, ordinary estimates, and £52,450 extraordinary estimates. The sum of £61,600 is to be spent on the coast-defence ship Herluf Trolle, exclusive of £23,550 on armament; £5520 will be devoted to a coast-defence ship of the same type, to be laid down, of 5317 tons displacement; and £43,670 to necessary repairs in the Tordenskjold and the gunboat Grönsund. In the extraordinary estimates are sums of £5468 for mines, £5250 for new guns, and £940 for harbour works.

The torpedo-boats Söbjörnen and Havörnen, sisters of the Hajen, launched at Copenhagen in 1896, have completed their trials. With 2317 I.H.P., a mean speed of 22·9 knots was obtained. They have triple-expansion engines to which steam is supplied by two Thornycroft boilers.

Greece.

There is nothing to report with regard to the Greek Navy during the past year, except the publication of a written deposition of Prince George of Greece as to the failure of the fleet during the recent Græco-Turkish War, which he attributes to the absence of any definite plans of operations at the Ministry of Marine, and the unpreparedness of the Navy in time of peace. Referring to the instructions issued from time to time to Commodore Sachtouris, the Prince wrote: "In my opinion such orders could only be issued by persons possessing no knowledge of naval affairs; their contradictory character confronted those who were responsible for their execution with a dilemma." No manœuvres on a large scale were ever carried out, the ships were undermanned, and neither officers nor men were exercised in their duties.

Morocco.

A small gunboat of 450 tons, for the suppression of piracy, has been launched in Italy, at Sampierdarena.

Netherlands.

The protected cruisers Holland, Friesland and Zeeland, of 3900 tons displacement, have been commissioned. They are fitted with two cylindrical and eight Yarrow water-tube boilers. The following are the results of their trials:—

With Four Yarrow Boilers.

	Rev.	I.H.P.	Speed.
Holland . . .	80·5	1778	11·6
Friesland . . .	87·2	2006	12·5
Zeeland . . .	78·6	2002	12·4

With all Boilers.

	Rev.	I.H.P.	Speed.	Coal per I.H.P. per hr.
Holland . .	145·8	10·548	19·6	1·026
Friesland . .	147·3	10·416	19·87	0·75*
Zeeland . .	138·6	10·589	19·47	0·927

* Consumption for auxiliary engines not included.

Utrecht. The armoured cruiser Utrecht, laid down at Amsterdam on May 15, 1897, was launched on July 15. Length, 310 ft. 8 in.; beam, 48 ft. 6 in.; draught of water aft, 17 ft. 8 in.; displacement, 4033 tons. The hull is protected by a 6-in. belt, and by a 2-in. armoured deck. The armament comprises two 6-in. Q.-F. guns mounted in turrets protected by 9½-in. armour forward and aft, six 4·7-in., four 2·9-in., four 1·4-in. Q.-F. guns, four machine-guns, and four torpedo-tubes. There are two triple-expansion engines, to which steam is supplied by twelve Yarrow boilers; with 9750 I.H.P. the estimated speed is 20 knots; coal supply, 850 tons.

The Gelderland was launched at Feijenoord, near Rotterdam, on September 28. The third ship of the same type, the Noord Brabant, is building at Flushing.

A coast-defence ship of 4950 tons, and of the Kortnaer class improved, the Koningin Regentes, has been laid down at Amsterdam. The following description is taken from the *Army and Navy Gazette*:—"She will be 316 ft. 10 in. long, with 51 ft. 6 in. beam, and will be protected by 6-in. side armour of Harveyed or nickel steel for a depth of over 8 ft., and 9·8-in. steel on the barbettes, as well as by a 2-in. deck. The armament will comprise two 9·4-in.

guns singly in the barbette turrets, and four 5·9-in., six 2·9-in., and eight 1·4-in. guns, with two torpedo-tubes. Engines of 5300 horse-power, supplied by Yarrow boilers, are to give a speed of 16 knots, and the coal capacity will be 680 tons, giving a range of 6000 miles at 10 knots." The total cost of the ship will be £347,500.

A memorandum presented with the estimates of 1898 stated that an amourclad for the East Indies and general service, of which the plans were not ready, would soon be laid down.

Norway.

Extra-ordinary expenditure. Towards the end of 1898 an extraordinary credit of £888,888 was voted by the Storthing, of which £527,777 are to be devoted to the building of two new armoured vessels, and the remainder for various fortified and other works:—Sölvik, £3880; Dröbak, £51,280; Bergen, £22,220; Agdänas, £22,220, and £3055 for a refuge harbour at that place; Tönsberger Fjord, £31,666; Rödfo Powder Factory, £22,220; and Bergen Docks, £8890. Towards perfecting the arrangements for the mobilisation of torpedo-boats a sum of £11,110 will be devoted.

New ships. The two new ships provided for will be of the Harald Haarfagre and Tordenskjold class, and have been ordered of Messrs. Armstrong, who constructed both the vessels named. Length, 290 ft.; beam, 50 ft. 6 in.; draught, 16 ft. 6 in.; displacement, 3850 tons; I.H.P., 4500; speed, 16½ knots; coal supply (normal), 250 tons; with bunkers full, 400 tons. In the new ships woodwork will be banished wherever possible. They will have a belt of nickel steel armour 6 in. thick. The armour on the casemates is 5 ins. to 2 ins., and on the barbettes 6 ins. in thickness. The armament comprises two 8-in. guns in barbettes, six 6-in. Q.-F. on the broadsides, and eight 12-pr. and six 3-pr. Q.-F. guns, besides 2 submerged torpedo-tubes. The ships will have water-tube boilers.

Manœuvres. In the *Mittheilungen aus dem Gebiete des Seewezens* (XII., 1898) was an account of the manœuvres of the Norwegian Squadron last summer. Although the importance of the Skager Rack channel is less than before the construction of the Kaiser Wilhelm Canal, it is recognised that the channel between Skagen and Cape Lindesnäs might play an important part in the case of war between England and Russia, when the neutrality of Norway might be compromised. In the course of the manœuvres all the bays and inlets on the Norwegian side in the neighbourhood of the Tönsberger Fjord were examined, and the conclusion was reached that in case of a blockade of Copenhagen the Tönsberg district would be of great importance in

regard to operations of supply. The manœuvres showed that a hostile fleet would find the greatest difficulty in maintaining an effective blockade of the neighbouring coast, or in making possible a landing, if the islands were occupied by the defenders and the channels mined. The defending torpedo flotilla would have excellent anchorages where it could lie, to issue at night and make attacks on the enemy's ships with every chance of success.

PORTUGAL.

The cruiser Dom Carlos I. has been launched at Elswick. The following are the particulars :—Length, 360 ft.; breadth, 46 ft. 6 in.; mean draught, 17 ft. 6 in.; displacement, 4100 tons. The armament consists of four 6-in., eight 4·7-in., and twelve 3-pr. Q.-F. guns, four machine-guns, and five torpedo-tubes (three submerged). The vessel is sheathed with wood and copper, and has a protective deck of 1¾ in. on the flat, and 4 in. on the slopes. She has a coal capacity of 1000 tons, and carries 700 tons on her normal draught, which will enable her to steam some 10,000 miles at a moderate speed. Her estimated speed is 22 knots with forced draught, and 20 knots with natural draught.

One of the small third-class cruisers completing at Havre, the São Gabriel, was launched on May 7, and the other, the São Rafael, on July 5. The particulars of these vessels are as follows :—Displacement, 1800 tons; length, 246 ft.; beam, 35 ft. 6 in.; mean draught, 14 ft. 3 in. The engines are expected to develop 2650 I.H.P. with a speed of 15 knots. The cruisers are designed to carry an armament of two 5·9-in., four 4·7-in., and eight 1·8-in. Q.-F. guns of Canet pattern.

Two gunboats of 220 tons, the Al. Baptista de Andrade and Thomaz Andrea, with a small quick-firing armament, are building for Mozambique and the island of Timor.

The *personnel* of the navy numbers in all 4730, of whom one is an admiral, ten are captains, fourteen commanders, fifteen corvette captains, fifty-nine lieutenants, and ninety-four sub-lieutenants.

ROUMANIA.

Programme. A scheme has been prepared for the construction of a coast-defence fleet for the protection of the Lower Danube and the Danube mouths, and for the building of forts and the purchase of mines. The total cost is estimated at £2,400,000, spread over a period of five years,

of which shipbuilding and armament will absorb £1,800,000. A Danube flotilla, comprising eight monitors of 500 tons, twelve torpedo-boats of 40 tons, and eight vedettes; and a coast-defence squadron for the Black Sea, consisting of six armoured vessels of 3500 tons, four destroyers of 300 tons, and twelve torpedo-boats of 80 tons, are to be organised. A floating dock for Galatz has been built in Dundee, with provision for its being taken in sections to the Roumanian port.

Spain.

This chapter is usually a record of additions to the various navies during the year under review. As far as concerns Spain, it is, on the present occasion, a record of losses. At the commencement of the war with the United States, Spain possessed several fine armoured cruisers of modern construction, which caused great inconvenience to the United States, and for a time prevented the invasion of Cuba. But the use of them was badly directed by the Government, and the task imposed upon the admiral in command was beyond his power, so that the end was sooner or later inevitable.

At the battle of Manila, on May 1, the following vessels were destroyed or very seriously damaged: the cruiser Reina Christina, 3520 tons displacement, launched in 1886; the small cruisers or gunboats Don Antonio de Ulloa and Don Juan de Austria, of 1130 tons, built in Spain in 1887; the Isla de Cuba and Isla de Luzon, launched at Elswick in the same year; the wooden cruiser Castilla, 3342 tons, launched in 1881; the small cruiser Velasco, 1152 tons, and the gunboats Elcano, General Lezo, and Marquis del Duero. Of these the Don Juan de Austria, Isla de Cuba, and Isla de Luzon have since been rais by the Hong Kong Dock Company. They are now under repair at Hong Kong, and are to be added to the U.S. Navy.

In the running engagement off Santiago on July 3 the armoured cruiser Cristobal Colon, 6840 tons, which had just been completed, and had not all her guns on board, and the sister-ships Infanta Maria Teresa, Vizcaya, and Almirante Oquendo (7000 tons), built at Bilbao in 1889–91, were driven on shore. The Maria Teresa, afterwards refloated, was lost at sea in a gale of wind on her passage to the United States, owing to the opening of leaks in her patched hull. The new destroyers, Furor and Pluton, were destroyed almost as soon as they issued from Santiago Harbour on July 3. The cruiser Reina Mercedes, 3090 tons, was sunk at Santiago on July 5, but has been refloated by the Americans. The gunboats Centinella

and Delgado Parayo were burned at Manzanillo on July 20, and the small cruiser Jorge Juan, of 935 tons, was sunk on the north-east coast of Cuba on July 21. A considerable number of smaller gunboats, of 200 to 300 tons displacement, were captured, and have been added to the American Navy. They include the Hernan Cortez, Pizarro, Vasco Nuñez de Balboa, Velazquez, Alvarado, Sandoval, Alerta, Ardilla, Flecha, Fradera, Satelite, Vigia, Cauto, General Blanco, and Intrepida.

At the beginning of the war the Normannia (10,500 tons), Columbia (9500 tons), and Havel (8900 tons), of the Hamburg-American Line, were purchased for conversion into cruisers, and renamed respectively Rapido, Patriota, and Meteoro, but are to be sold.

The third-class cruiser Rio de la Plata was launched at Havre on September 17: displacement, 1075 tons; I.H.P., 7100; speed, 20 knots.

At the end of December a destructive fire took place in the Government Dockyard at Ferrol.

SWEDEN.

A new coast-defence ship of the Oden type, modified, has been laid down. She is named the Dristigheten. Displacement, 3450 tons; length, 285 ft. 6 in.; beam, 49 ft. 3 in.; mean draught, 16 ft. 1 in. The thickness of the side and gun-position armour is 7⅞ ins. of nickel steel, and of the deck 2 ins. With 5000 I.H.P., the estimated speed is 16 knots. The ship will have water-tube boilers. The armament will comprise two 8·2-in. guns, six 5·9-in., and ten 2·2-in. Q.-F. guns, and two submerged torpedo-tubes.

Two torpedo-gunboats, the Jacob Bagge and Psilander, have been ordered from Messrs. Yarrow. Length, 223 ft; beam, 27 ft. 6 in.; draught, 8 ft. 9 in.; displacement, 670 tons; I.H.P., 4000; speed, 20 knots; armament, two 4·7-in., four 2·2-in. Q.-F. guns, and one torpedo-tube. The Claes Horn and Claes Uggla, boats of the same class, are also building. At Elbing, Herr Schichau has launched the first-class torpedo-boats Blixt, Stjerna and Meteor (sisters of the Komet, 90 tons, 23 knots), and is constructing three others of the class, the Orkan, Bris and Vind.

The following is taken from the *Army and Navy Gazette*:—"The Navy of Sweden is to be increased by two cruisers, the Njord and the Thor, of 3,300 tons, launched in 1898. These vessels will each carry two guns of 9·8-in., six of 4·7-in., fourteen machine-guns, and one torpedo-tube. The speed is not to be less than sixteen knots. The Ministry of the Marine has asked Parliament to grant a supplementary

vote for the purpose of modernising three cruisers of the fleet that have become out of date, although they are in a perfect state of preservation. These vessels will also be fitted with more powerful quick-firing guns. It has been deemed to be indispensable to apply to Parliament for this supplementary vote, in view of the fact that in a very short time the Norwegian Navy will have at its disposal four armed cruisers, which will all be more powerful than the Swedish vessels of the same class."

The old monitor John Ericsson has been refitted, the 9·4-in. turret-guns having been replaced by 6-in. guns in a barbette, with shields, and the Berserk and Ulf have each received a 4·7-in. Q.-F. gun.

Large sums are being expended upon coast defences. The cost of fortifying Waxholm and Oscar-Frederiksborg is estimated at £158,300, of Carlskrona at £270,520, of Carlsborg at £104,900, and of the island of Gothland at £55,000. For the erection of a fort at Boden, in Upper Norrland, a sum of £480,300 is required, and the seaward defence of Gothenburg, with the erection of a fort at Vesterberget, will absorb £91,650.

Turkey.

The old battleships Assar-i-Tewfik and Messoudieh * have arrived at Genoa to be refitted by Messrs. Ansaldo. Their hulls are in as good condition as when they were built. They are to have new engines, Niclausse boilers, twin screws instead of single screws, new armour and a new armament. The main armament in both cases will consist of two 9·2-in. Armstrong guns, mounted in two barbettes at either end of the ship. (The Azizieh, Mahmoudieh, Orkanieh and Osmanieh have already been rearmed on the same plan). The Messoudieh, which is of 9120 tons displacement, will carry 12 6-in., 16 12-pr., and 10 6-pr. Q.-F. guns; the Assar-i-Tewfik, which is over 2000 tons smaller, will carry 2 9·2-in., 6 6-in. Q.-F., 10 12-pr., 12 6-pr.

JOHN LEYLAND.
T. A. BRASSEY.

* The Editor visited these ships at Genoa in March.

CHAPTER III.

Comparative Strength.

On the opposite page is given a list of the most important squadrons in commission in European waters. There has been little change in the composition of the British squadrons since last year. The Mediterranean squadron consists of ten, the Channel fleet of eight, and the Reserve squadron of ten battleships. The Devastation has been sent as port-guard ship to Gibraltar; the Rupert has been transferred to Alexandria.

On the other hand, there have been very great changes in the distribution of French ships. The Bouvet and Masséna have been commissioned, and the Mediterranean permanent squadron now consists of the six most powerful battleships in the French Navy and three of the Magenta class, which, as will be seen by the accompanying tables, have been relegated to the second class. The Bouvines, Tréhouart, Jemmapes, and Valmy have been transferred from the Channel, and, together with the Caïman, form the second division of the Mediterranean squadron. The Terrible is to be added to this division as soon as her refit is completed. The older battleships, which have for many years formed the strength of the French Mediterranean fleet, have been transferred to the Northern squadron, which now consists of six battleships. The battleship strength of the French squadrons thus consists of no less than twenty battleships,* including the Jemmapes and Valmy, as compared with sixteen ships last year.

To sum up: adopting the new classification for the tables, Great Britain has sixteen first-class, nine second-class, and four third-class battleships in commission in European waters. France has six of the first-class, eight of the second-class, and five of the third-class.† The cruiser strength of the British squadron is much the same as last year; that of the French has been very considerably increased. In spite of the increase in strength of the French European squadrons, the squadrons which we maintain in commission should be well able to hold their own. The Mediterranean and Channel fleets combined are far more powerful than the French Mediterranean squadrons. Our Reserve squadron would be well able to deal with the French Northern squadron.

* Excluding Terrible.

† Excluding Jemmapes and Valmy.

	GREAT BRITAIN.			FRANCE.			RUSSIA.
Class.	Mediterranean Fleet.	Channel Fleet.	Reserve Squadron of Coast and Port Guard Ships.	Mediterranean Fleet. Permanent Squadron.	Mediterranean Fleet. Reserve Division.	Northern Squadron.	Mediterranean.
Battleships	Anson ✓ Cæsar Camperdown Empress of India Hood Illustrious Ramillies Revenge Royal Oak Royal Sovereign Devastation (Gibraltar)	Hannibal Jupiter Majestic Magnificent Mars Prince George Repulse Resolution	Alexandra (C.G.) Benbow (C.G.) Collingwood (C.G.) Colossus (C.G.) Howe (P.G.) Nile (P.G.) Rodney (C.G.) Sans Pareil (P.G.) Thunderer (P.G.) Trafalgar (P.G.) Conqueror } *Tenders* Hero }	Bouvet Brennus Carnot Charles Martel Jauréguiberry Masséna	Amiral Tréhouart Bouvines Caïman Terrible Jemmapes Valmy Magenta Marceau Neptune	Amiral Baudin Courbet Dévastation Amiral Duperré Formidable Redoutable	Alexander II.
Coast-Guard Ships	Rupert (Alexandria) Orion (Malta)	..	..	..	Achéron (Bizerta) Tempête (Bizerta)	Cocyte (Dunkirk)	Grosjastchy ‡
Cruisers, 1st Class	Gibraltar Hawke	Blake Diadem	Australia Galatea	Chanzy, Latouche-Tréville Pothuau D'Entrecasteaux* Guichen *	..	Dupuy-de-Lôme Bruix	..
Cruisers, 2nd Class	Dido, Isis, Scylla Thetis Venus	Arrogant Furious	Severn	D'Assas Du Chayla Cassard	..	Catinat	..
Smaller Cruisers and Gunboats	4	Pelorus	Melampus	Galilée, Lavoisier Foudre, Linois	..	Surcouf	1
Torpedo-Gunboats	Harrier, Halcyon Hazard, Hebe Hussar Salamander *Torpedo Ram.* Polyphemus	..	..	Condor (Crete) Léger Lévrier *Torpedo depot ship.* Foudre	Dague (Algeria) Flèche (Tunis) Bombe (Constantinople)	Cassini Epervier St. Barbe (Dunkirk)	Posadnik
Destroyers	6	..	..	6†	..	3†	..

* At Toulon; not attached to Mediterranean Squadron. † Sea-going torpedo-boats. ‡ To be replaced by Khrabry.

Italy.

In the Italian Navy Estimates for the current year it is provided that the Active squadron (in full commission for eight months and four months in reserve) is to consist of five battleships, viz., Lepanto, Sardegna, Sicilia, Re Umberto, Andrea Doria, the armoured cruiser Garibaldi, and four smaller cruisers, while the Reserve squadron (in full commission for three months and for nine months in reserve) is to comprise the three battleships Morosini, Dandolo, Lauria, the armoured cruiser Varese, and four smaller cruisers. At the present moment the Active squadron includes six battleships, viz., Lepanto, Sardegna, Re Umberto, Andrea Doria, Morosini, Lauria, the cruiser Lombardia, and two torpedo gunboats; the Reserve squadron consists of the Sicilia, Affondatore, Castelfidardo, and the cruisers Partenope and Urania. The Dandolo is not yet in commission. The cruisers Fieramosca, Piemonte, and Calabria form the "Oceanic Naval division."

Russia and Germany.

The Russians have in commission in the Baltic for four months (1) a practice squadron, consisting of the battleship Poltava, four coast-defence ships, and the gunboat Abrek; (2) a training squadron, consisting of the General Admiral and three old coast-defence ships; (3) the battleship Nicholas I. for training engineers. Except that the Rostislav is now completed, the strength of the Baltic squadron is the same as last year. The Germans have four first-class and three third-class battleships, besides four coastguard ships and several cruisers in commission in home waters.

There is little which calls for remark as regards the squadrons outside the limits of European waters. Even on the China station, on which attention has been largely concentrated during the past year, there has been little change in the composition of the British, German and Russian squadrons. The French have reduced their China squadron to a simple division. The Italians have three cruisers in commission in China. The British squadron, since it has been strengthened by the battleship Victorious, should be able to hold its own against any probable combination in the waters of Eastern Asia.

Strategic position in Far East.

It will, perhaps, not be out of place here to make some observations with regard to the strategic position in the Far East. Ever since the conclusion of the Chino-Japanese war, when Russia, France, and Germany objected to Japan obtaining control of Port Arthur, it has been evident that Russia aimed at possessing herself of an ice-free port in Manchuria—a perfectly justifiable wish. This she has succeeded in doing, with the result that she now controls the whole of the province of Manchuria, and that Port Arthur has been strongly fortified and garrisoned. A *Times* correspondent reports the

strength of the garrison as 13,000 men. As a counterpoise to the dominating influence of Russia in Northern China, we demanded and obtained a lease of the port of Wei-hai-wei, which, except in the event of war with Russia, is of little value to us. It is, however, suitably placed as the base of a fleet observing Port Arthur. When the trans-Siberian railway is completed, the strategic situation

SHIPS IN COMMISSION.

EASTERN ASIA.

CLASS.	BRITISH.	FRENCH.	RUSSIAN.	GERMAN.	UNITED STATES.
BATTLESHIPS	·Victorious ·Centurion ·Barfleur	Vauban	Navarin Sissoi Veliky	Kaiser Deutschland	Oregon
1st-Cl. Cruisers	·Immortalité ·Narcissus ·Undaunted ·Powerful ·Grafton	..	Rossia Rurik Pamyat Azova Dmitri Donskoi Vladimir Monomach	Kaiserin Augusta	
2nd-Cl. Cruisers	·Bonaventure ·Hermione ·Iphigenia	Duguay-Trouin Descartes Pascal	Ad. Korniloff	Irene Gefion Prinzess Wilhelm	Olympia Baltimore Charleston Raleigh
3rd-Cl. Cruisers	·Archer ·Alacrity ·Brisk	..	Zabiaka Rosboinik (?)	Arcona Cormoran	Boston
SLOOPS, etc. .	9	2 2 (Cochin-China)	4		8*
TORPEDO-GUNBOATS	..	..	2		
ARMOURED GUNBOATS	..	Styx	Gremiastchy Otvajny		
MONITORS .					Monadnock Monterey

* This includes the Isla de Cuba, Isla de Luzon and Don Juan de Austria, captured from the Spaniards at Manila. The United States have besides several auxiliary cruisers and other vessels in commission in the Philippines.

in the Far East will be materially affected, as Russia should be able to hold her possessions in those waters notwithstanding our command of the sea. Russia has thus, for the time, secured all she wants. She needs rest to consolidate her hold over Manchuria and to push on with the railway. When that is completed, she may make a further move south. As China is inhabited by some three to four hundred millions of the human race, we cannot view with equanimity the securing by any single Power of the control of that vast popula-

tion, and the possible exclusion of British commerce from the country. While the rapid rise in the naval strength of Japan, and the fact that the United States, Germany, and Japan are all interested in maintaining the policy of the "open door" in China, are satisfactory features in the situation, a good understanding with Russia is very desirable.

SHIPS IN COMMISSION.

EAST INDIES.

Class.	British.	French.
2nd-Cl. Cruiser . . .	· Eclipse	
3rd-Cl. Cruisers . . .	· Marathon · Melpomene · Racoon	Fabert D'Estaing
Sloops and Gunboats . .	4	2
Torpedo-Gunboats . .	2 (1 *in reserve*)	
Coast-Defence Ships . .	· Magdala · Abyssinia (*In reserve*)	

ATLANTIC.

Class.	British.		French.	United States.
	Cape.	America.		
Battleships . .	· Monarch (*In reserve, Capetown*)	· Renown		Indiana Massachusetts Texas
Coast-Defence Ships	· Penelope	· Hotspur (*In reserve, Bermuda*)		
1st-Cl. Cruisers .				Brooklyn New York
2nd-Cl. Cruisers .	· Doris · Fox	· Indefatigable · Intrepid · Talbot · Flora	Dubourdieu * Sfax	Chicago Cincinatti Newark New Orleans San Francisco
3rd-Cl. Cruisers .	· Magicienne · Philomel · Phœbe · Barracouta · Barrosa · Tartar	· Pallas · Pearl · Proserpine		Detroit Marblehead Montgomery
Sloops and 1st-Cl. Gunboats . .	4	6	1	6
Destroyer . . .		1		

* To be relieved by the Cécille.

PACIFIC.

CLASS.	BRITISH.		UNITED STATES.
	AUSTRALIAN STATION.	PACIFIC STATION.	
BATTLESHIP . .	..	..	Iowa
1st-Cl. CRUISERS .	·Royal Arthur	·Impérieuse	..
2nd-Cl. CRUISERS .	..	·Amphion ·Leander ·Phaeton	..
3rd-Cl. CRUISERS .	·Katoomba ·Mildura ·Ringarooma ·Tauranga ·Wallaroo ·Mohawk ·Porpoise ·Royalist	..	..
COAST-DEFENCE SHIP	·Cerberus	..	..
SLOOPS and GUN-BOATS	3	2	4
TORPEDO-GUNBOATS	2	..	..
DESTROYER	..	1	..

The French have only one sloop, the Germans two small cruisers, in commission in the Pacific.

The Comparative Tables, of which a summary is printed on the next page, have undergone several important changes since last year. Detailed lists of the United States and Japanese ships in each class are included for the first time—a step necessitated by the rapid growth of these navies. Including ships under construction, the United States possesses more battleships of the first class than any country except Britain. Comparative tables

Some indication was given last year, by the sub-division of certain classes into two sections, that a re-classification would shortly be necessary. It has been suggested that class distinctions should be practically abolished, and that all battleships (or, as some would prefer, "capital ships"), all cruisers, and all special or smaller craft should be classified together. There is much to be said in favour of this view, because there must always be certain ships on the border-line between two classes, and they may be placed in either the higher or the lower class, according to the judgment of the classifier. For instance, the Bouvines and Tréhouart, as regards size and armament, clearly belong to the third class; but as regards speed and protection, they are worthy of being ranked with the second class. On the other hand, it seems undesirable to allow anyone using these tables to suppose that the same value can be given to the Sultan or Difficulties of classification.

EFFECTIVE FIGHTING SHIPS, BUILT AND BUILDING.

Class.	Great Britain.			France.			Russia.			Italy.			Germany.			United States.			Japan.		
	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.
Battleships—																					
1st-Class . .	18	16	34	8	3	11	4	6	10	3	4	7	5	4	9	4	8	12	2	4	6
2nd-Class . .	11	..	11	9	1	10	10	..	10	5	..	5	..	..	..	..	..	..	..	..	..
3rd-Class . .	12	..	12	15	..	15	1	..	1	2	..	2	7	..	7	1	..	1	1	..	1
Total Battleships	41	16	57	32	4	36	15	6	21	10	4	14	12	4	16	5	8	13	3	4	7
Coast-Guard Ships .	23	..	23	16	..	16	15	1	16	3	..	3	19	..	19	6	4	10	1	..	1
Cruisers—																					
1st-Class . .	21	12	33	3	11	14	4	11	15	2	4	6	2	1	3	4	..	4	1	5	6
2nd-Class . .	57	3	60	21	4	25	7	..	7	5	..	5	8	..	8	11	..	11	9	..	9
3rd-Class . .	41	3	44	11	2	13	2	4	6	10	..	10	10	3	13	5	..	5	3	..	3
Total Cruisers .	119	18	137	35	17	52	13	15	28	17	4	21	20	4	24	20	..	20	13	5	18
Torpedo-Gunboats .	34	..	34	21	..	21	9	..	9	15	2	17	4	..	4	..	..	..	..	..	..

the Inflexible as to the Royal Sovereign or the Formidable. The balance of argument, on the whole, is in favour of retaining some form of classification, at any rate for the present.

Changes.

The changes that have been made are as follows:—All the first-class battleships in Section B have been removed to the second class; most of the second-class battleships have been removed to the third class, the exceptions being three or four Russian and one French modern ship. The less effective of the third class have been struck out or transferred to the coast-guard list, which will comprise in future, besides coast-defence ships proper, the least efficient ships of the various navies. It will be remarked that new ships are laid down and completed, especially in our own navy, much more rapidly than old ships are struck off the list, and that the older ships tend to approximate in value—in other words, that there is much less difference between the fighting value of the Alexandra and Audacious as compared with that of the Majestic, than there was between that of the Alexandra and that of the Audacious ten or twenty years ago. There is, therefore, less reason for maintaining class distinctions for the older ships, and probably further changes in the direction of abolishing such distinctions will appear necessary next year.

Cruisers *versus* Battleships.

As regards the cruiser classes themselves, classification is less difficult; but it is not easy to draw the line between some cruisers and some battleships. Formerly there was an easy mode of distinguishing the line-of-battle ship from the frigate and the frigate from the sloop. The line-of-battle ship had two or three gun-decks, the frigate one, while the sloop was flush-decked. The large armoured cruisers which are being built for many navies are from some points of view as powerful as the second-class battleships, and would no doubt, in certain circumstances, fight in the line of battle. Is not the Cressy fit to "lie in a line" with the Collingwood or even the Barfleur, or the Jeanne d'Arc with the Dévastation or the Courbet? The cruisers have the advantage in speed and in protection for the secondary armament; the battleships have the advantage in the power of the main armament and in protection for the hull of the ship. The cruiser could probably silence the secondary armament of the battleship and inflict great damage; the battleship, on the other hand, has the power, which the cruiser has not, of inflicting a vital blow. As compared with a modern battleship, the cruiser's only advantage is her speed. We therefore adhere to the opinion expressed last year, that unless the modern cruiser can fight the modern battleship, she will not secure the command of the sea. The relative strength of navies must still be estimated mainly by relative strength in battleships.

Battle-ships completed.

Owing to the adoption of the changes in classification described above, our position as regards first-class battleships is very satisfactory, and would have been even better but for the unfortunate dispute in the engineering trade, which has delayed the completion of the Canopus class. We have eighteen vessels in this class completed, as against eight for France, four for Russia, and five for Germany. Of second-class battleships we have only eleven, as against nineteen for France and Russia; and in the third class we have only twelve as against sixteen, the deficiency in the latter case being mainly due to the removal of six ships, the Audacious, etc., which are thirty years old or over, to the list of coastguard ships. The French list of third-class battleships includes five vessels built of wood, the Colbert, Richelieu, Trident, Duguesclin, and Turenne. The Budget Committee struck the votes for the repairs and maintenance of these vessels out of the Estimates, and they, with the two armoured cruisers the Bayard and Vauban, must soon disappear from the list.

Battle-ships building.

Under construction we have no less than sixteen battleships, as against four for France, six for Russia, four for Germany, eight for the United States, and four each for Italy and Japan. In two years' time the United States will rank ahead of Germany or Italy as the fourth naval Power in the world. One battleship (A 8) is projected * in France, four in Russia, and three in the United States. There is some reason for doubting whether the four projected Russian ships will be commenced during the present year. As noted in the previous chapter there are no signs of extraordinary activity in Russian shipbuilding yards. The German battleships C, D, E are not yet laid down.

At the end of 1899 the probable strength in completed ships will be as follows:—

Battleships.	England.	France.	Russia.	France and Russia.
First-class	23	9	6	15
Second-class	11	9	9	18
Third-class	12	15?	3	18
Total . . .	46	33	18	51

The Franco-Russian combination would have a slight advantage in point of numbers, but in view of our large preponderance in ships of the first class, the British Navy will be at least equal in strength to the combined navies of France and Russia. In 1898 it was probably equal in strength to the navies of any other three Powers.

A careful consideration of our present position only strengthens the conclusion arrived at last year—that we have for the time

* Will probably be struck out.—Ed.

more than sufficient ships of the largest size under construction. We have before remarked on the increase of naval force in the waters of Northern Europe. The French Northern squadron has much increased in strength this year. The Russians have nearly completed the port of Libau, which will enable them to keep their Baltic Fleet in commission through the winter months. The German navy is growing rapidly. For operations within a short distance of the home bases we need sea-going vessels, well armed, well protected, and with good speed; but in order to obtain a larger number of ships for the same expenditure, some reduction in sea-keeping qualities may in our opinion be accepted. We note with satisfaction that in the four battleships just contracted for the displacement has been reduced to 14,000 tons.

We may conclude this review of comparative strength by quoting the opinion of a distinguished French naval officer. Rear-Admiral Dupont says:— Admiral Dupont.

"England can now put into line thirty-four battleships of from 9000 to 15,000 tons, fifty-two large cruisers, and a very large number of smaller vessels, among which should be noted a numerous flotilla of very rapid torpedo-boat destroyers. Besides these vessels, twenty older battleships, for the most part remodelled, may be reckoned as a solid reserve to this already formidable force.

"What have we to set against this array? Sixteen new battleships, eight good coast-defence vessels, about ten old battleships of mediocre value, and twenty-three modern cruisers. Reckoning on both sides the vessels that are of no use for service, and taking into account breakdowns and accidents, we may say, on the whole, that the strength of our Navy is between a third and a half of that of the English Navy. The quality of the similar vessels in both Navies is about the same. The English vessels have in general a look of greater strength, they can go greater distances, and their tonnage is greater, which enables them to be better armed and equipped. Their guns are well placed, but less powerful at an equal calibre. The speed is usually inferior to ours and can be less easily kept up, in spite of the nominal figures to be found in the numerous lists published in both countries.

"In a word, the value of similar types is approximately the same, but we remain in presence of a crushing numerical superiority. The staff is as good on one side of the Channel as on the other. The training of our officers and men is as good as possible, having been for years the object of constant attention. It may, therefore, be affirmed, and, I think, without misplaced boasting, that any single French vessel may stand comparison with the similar English one.

If we now examine the facilities for mobilisation we find that these are favoured in England by the existence of an inexhaustible maritime population, the best elements of which are yearly trained in vessels stationed in commercial ports. Our naval reserve will give us the requisite number of men, but under less good conditions, and our recruiting of the engine-room complement will remain inferior. Lastly, the concentration and victualling of the English forces is comparatively easy, whereas in France it will be less prompt and less certain on account of our geographical position between two seas separated by the Iberian peninsula. And in this respect our inferiority is increased by the inadequate preparations of stations outside Europe. While England is strongly posted at the outlets of all the great maritime lines of the globe, we are reduced to utilising a few indifferently placed positions. . . ."

T. A. Brassey.

Comparative Tables of British, French, Russian, Italian, German, Japanese, and United States Ships.

Table I.—First-Class Battleships.

GREAT BRITAIN.

Launched.	Name.	Displacement.
		tons.
1891	Empress of India	
1891	Hood	
1892	Ramillies	
1892	Repulse	14,150
1892	Resolution ...	
1892	Revenge	
1892	Royal Oak ...	
1891	Royal Sovereign	
1895	Renown	12,350
1894	Magnificent ...	
1895	Majestic	
1895	Prince George ...	
1895	Victorious ...	
1896	Cæsar	14,900
1896	Hannibal	
1896	Illustrious ...	
1895	Jupiter	
1896	Mars	
1898	*Albion*	
1897	*Canopus*	
1898	*Goliath*	
1899	*Glory*	12,950
1898	*Ocean*	
	Vengeance ...	
1898	*Formidable* ...	
1898	*Irresistible* ...	
1899	*Implacable* ...	
	London	15,000
	Venerable ...	
	Bulwark	
	Cornwallis ...	
	Duncan	
	Exmouth	14,000
	Russell	
	34 ships.*	

FRANCE.

Launched.	Name.	Displacement.
		tons.
1891	Brennus	11,215
1894	Carnot	12,008
1893	Charles Martel	11,692
1893	Jauréguiberry...	11,637
1895	Masséna	11,736
1896	Bouvet	12,012
1895	Charlemagne ...	
1896	Gaulois	11,097
1896	*St. Louis*	
1898	*Iéna*	11,870
	Suffren	12,728
	11 ships.	

RUSSIA.

Launched.	Name.	Displacement.
		tons.
1892	Tri Sviatitelia...	
	Kniaz Potemkim Tavritchesty	12,480
1894	Petropavlosk ...	
1894	Poltava	10,960
1895	Sevastopol ...	
1898	*Peresviet*	
1898	*Oslabya*	12,674
	Pobieda	
	Retwisan... ...	12,700
	Tzarevitch ...	13,100
	10 ships.†	

ITALY.

Launched.	Name.	Displacement.
		tons.
1888	Re Umberto ...	13,087
1890	Sardegna	13,640
1891	Sicilia	13,087
1897	*E. Filiberto* ...	
1897	*San Bon*	9,645
	Ra Margherita	
	Benedetto Brin	12,564
	7 ships.	

GERMANY.

Launched.	Name.	Displacement.
		tons.
1891	Brandenburg ...	
1891	Kurfürst Friedrich Wilhelm	9,874
1891	Weissenburg ...	
1892	Wörth	
1896	Kaiser Friedrich III.	
1897	*König Wilhelm II.*	
	Ersatz - König Wilhelm... ...	10,933
	A	
	B	
	9 ships.‡	

UNITED STATES.

Launched.	Name.	Displacement.
		tons.
1893	Indiana	
1893	Massachusetts...	10,288
1893	Oregon	
1896	Iowa	11,410
1898	*Kearsarge* ...	
1898	*Kentucky* ...	11,525
	Alabama	
	Illinois	11,525
	Wisconsin ...	
	Maine	
	Missouri	12,500
	Ohio	
	12 ships.‖	

JAPAN.

Launched.	Name.	Displacement.
		tons.
1896	Fuji	
1896	Yashima	12,320
	Asahi	
	Hatsuse	15,000
1898	*Shikishima* ...	14,850
	1 *Unnamed at Barrow*... ...	15,000
	6 ships.	

* 2 projected.

† 4 projected, of which two have been ordered.

‡ 3 (C, D, E) projected.

‖ 3 projected.

TABLE II.—SECOND-CLASS BATTLESHIPS.

GREAT BRITAIN.			FRANCE.			RUSSIA.			ITALY.			GERMANY.			UNITED STATES.			JAPAN.		
Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		Tons.			Tons.			Tons.			Tons.									
1888	Nilo	11,940	1883	Baudin	11,723	1892	Georgi Pobiedonosets	10,280	1880	Italia...	14,160									
1887	Trafalgar		1879	Duperré	11,032	1891	Navarin	10,206	1883	Lepanto	14,173									
1886	Anson	10,600	1881	Courbet	10,637	1886	Catherine II. ...		1885	Andrea Doria ...										
1885	Benbow	10,600	1879	Dévastation ...	10,535	1887	Sinope	10,181	1884	Lauria	10,826									
1885	Camperdown ...	10,600	1885	Formidable ...	11,972	1886	Tchesmé		1885	Morosini										
1882	Collingwood ...	9,500	1886	Hoche	10,823	1894	Sissoi Veliky ...	8,880												
1885	Howe	10,300	1890	Magenta	10,680	1896	Rostislav													
1884	Rodney	10,300	1887	Marceau	10,679	1889	Nicolai I.	9,672												
1887	Sans Pareil ...	10,470	1887	Neptune	10,810	1887	Alexander II. ...	9,927												
1893	Barfleur	10,500		*Henri IV.*	8,948	1890	Dvenadzat Apostoloff ...	8,076												
1892	Centurion... ...																			
	11 ships.			10 ships.			10 ships.			5 ships.										

TABLE III.—THIRD-CLASS BATTLESHIPS.

GREAT BRITAIN.			FRANCE.			RUSSIA.			ITALY.			GERMANY.			UNITED STATES.			JAPAN.		
Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		tons.			tons.			tons.			tons.			tons.			tons.			tons.
1875	Alexandra ...	9,490	1873	Friedland... ...	8,852	1872	Peter Veliky ...	9,891	1878	Dandolo	11,025	1880	Baden	7,283	1892	Texas	6,315	1882	Chin Yuen ...	7,400
1882	Colossus	9,420	1876	Redoutable ...	9,288				1876	Duilio	10,962	1878	Baiern							
1882	Edinburgh ...		1885	Caiman	7,520							1877	Sachsen							
1871	Devastation ...	9,330	1883	Indomptable ...	7,513							1878	Württemburg...							
1872	Thunderer ...		1885	Requin	7,698							1874	Deutschland ...	7,555						
1875	Dreadnought ...	10,820	1881	Terrible	7,455							1874	Kaiser							
1868	Hercules	8,680	1875	Colbert*	8,783							1884	Oldenburg ...	5,118						
1876	Inflexible... ...	11,880	1873	Richelieu* ...	8,984															
1868	Monarch	8,320	1876	Trident*	8,717															
1870	Sultan	9,290	1880	Bayard	5,915															
1875	Superb	9,170	1883	Duguesclin* ...	6,112															
1876	Temeraire ...	8,540	1879	Vauban	6,249															
			1882	Turenne*... ...	6,112															
			1892	Bouvines	6,505															
			1893	Trehouart... ...	6,524															
	12 ships.			15 ships.			1 ship.			2 ships.			7 ships.			1 ship.			1 ship.	

* Built of wood.

Table IV.—Coastguard and Harbour Defence Ships.

GREAT BRITAIN.

Launched.	Name.	Displacement.
	C G	tons.
1879	Agamemnon ...	8,660
1880	Ajax	
1869	Audacious ...	
1869	Invincible ...	6,010
1870	Iron Duke ...	
1865	Bellerophon ...	7,550
1874	Neptune	9,310
1870	Swiftsure	6,910
1870	Triumph	6,640
1881	Conqueror... ...	6,200
1885	Hero	
1872	Rupert	5,440
	H D	
1870	Abyssinia ...	2,900
1876	Belleisle	4,870
1879	Orion...	
1870	Cerberus	3,480
1870	Magdala	3,340
1871	Glatton	4,910
1871	Cyclops	
1871	Gorgon	3,560
1871	Hecate	
1871	Hydra	
1870	Hotspur	4,010
	23 ships.	

FRANCE.

Launched.	Name.	Displacement.
	C G	tons.
1892	Jemmapes ...	6,485
1892	Valmy	
1877	Fulminant ...	5,871
1883	Furieux	5,925
1876	Tempête	4,793
1880	Tonnant	5,010
1875	Tonnerre	5,765
1878	Vengeur	4,635
	H D	
1885	Achéron	1,693
1887	Cocyte	1,688
1892	Phlégéton ...	1,767
1892	Styx	1,767
1885	Flamme	1,107
1884	Fusée	1,122
1888	Grenade	1,073
1886	Mitraille	1,112
	16 ships.	

RUSSIA.

Launched.	Name.	Displacement.
	C G	tons.
1894	Adm. Senjavin	
1893	Adm. Oushakoff	
1896	Gen. Adm. Apraxin ...	4,126
	Adm. Boutakoff	
	H D	
1868	Adm. Chicagoff	3,511
1867	Adm. Greig ...	3,593
1868	Adm. Lazareff	3,556
1867	Adm. Spiridoff	3,500
1864	Charodeika ...	2,026
1875	Kniaz Pojarski	5,138
1873	Popoff	3,590
1892	Novgorod	2,706
1890	Gremyastchy ...	
1892	Grostjastchy ...	1,492
1895	Otvazny	
1868	Khrabry	
	16 ships.	

ITALY.

Launched.	Name.	Displacement.
	C G	tons.
1865	Affondatore ...	3,997
1863	Maria Pia... ...	4,201
1863	San Martino ...	
	3 ships.	

GERMANY.

Launched.	Name.	Displacement.
	C G	tons.
1890	Beowulf	
1891	Frithjof	
1893	Hagen	
1892	Heimdall	3,440
1892	Hildebrand ...	
1889	Siegfried	
1895	Aegir...	3,503
1894	Odin	
	H D	
1878	Basilisk	
1876	Biene...	
1878	Camaleon ...	
1879	Crocodil	
1881	Hummel	
1887	Mucke	1,091
1880	Natter	
1880	Salamander ...	
1877	Skorpion	
1876	Viper...	
1876	Vespe	
	19 ships.	

JAPAN.

Launched.	Name.	Displacement.
	C G	tons.
1890	Ping-Yuen-Go...	2,000
	1 ship.	

UNITED STATES.

Launched.	Name.	Displacement.
	C G	tons.
1883	Amphitrite ...	
1876	Miantonomoh ...	
1883	Monadnock ...	3,990
1883	Terror	
1891	Monterey	4,084
1884	Puritan	6,060
	Arkansas	
	Connecticut ...	4,000
	Florida	
	Wyoming... ...	
	10 ships.	

Note.—C G = coastguard ships. H D = harbour defence ships.

TABLE V.—FIRST-CLASS CRUISERS.

GREAT BRITAIN.

Speed.	Name.	Displacement.
kts.		tons.
16	Impérieuse	8,400
16	Warspite... ...	
21½	Blake	9,000
21½	Blenheim... ...	
19¾	Crescent	7,700
20	Edgar	7,350
20	Endymion ...	7,350
19¾	Gibraltar	7,700
20	Grafton	7,350
20	Hawke	7,350
19¾	Royal Arthur ...	7,700
19¾	St. George ...	7,700
20	Theseus	7,350
22	Powerful	14,200
22	Terrible	
20¼	Andromeda ...	11,000
20¼	Diadem	
20¼	Europa	
20¼	Niobe	
20¾	*Amphitrite* ...	11,000
20¾	Argonaut	
20¾	Ariadne	
20¾	*Spartiate*	
21	*Aboukir*	12,000
21	*Cressy*	
21	*Hogue*	
21	*Sutlej*	
21	*Euryalus*	12,000
21	*Bacchante* ...	12,000
23	*Drake*	14,100
23	*Africa*	
23	*King Alfred* ...	
23	*Leviathan* ..	
	33 ships.*	

FRANCE.

Speed.	Name.	Displacement.
kts.		tons.
20	Dupuy de Lôme	6,305
19	D'Entrecasteaux	8,114
23	Guichen	8,146
23	*Jeanne d'Arc* ...	11,092
23	*Chateau Renault*	7,890
21	*Dupetit Thouars*	9,373
21	*Gueydon*	
21	*Montcalm*... ...	
21	*Condé*...	9,824
21	*Sully*	
21	*Gloire*	
21	*Desaix*	7,577
21	*Dupleix*	
21	*Kleber*	
	14 ships.†	

RUSSIA.

Speed.	Name.	Displacement.
kts.		tons.
16½	Admiral Nakimoff	8,524
18	Pamyat Azova	6,675
18	Rurik	10,933
20	Rossia	12,130
20	*Aurora*	6,630
20	*Diana*	
20	*Pallada*	
20	*Gromoboi* ...	12,236
21	*Bayan*	7,800
23	*Askold*	6,500
23	*Bogatyr*	
23	*Waryag*	
23	E	
23	F	
23	G	
	15 ships.	

ITALY.

Speed.	Name.	Displacement.
kts.		tons.
20	Carlo Alberto...	6,396
20	Vettor Pisani ...	
20	*Giuseppe Garibaldi*	7,282
20	*Varese*	
20	*F. Ferruccio* ...	
20	1 at Taranto ...	
	6 ships.	

GERMANY.

Speed.	Name.	Displacement.
kts.		tons.
21	Kaiserin Augusta	6,232
19	Fürst Bismarck	10,482
	A	
	3 ships.	

UNITED STATES.

Speed.	Name.	Displacement.
kts.		tons.
21·9	Brooklyn	9,215
21	New York ...	8,200
22·8	Columbia	7,375
23	Minneapolis ...	
	4 ships.‡	

JAPAN.

Speed.	Name.	Displacement.
kts.		tons.
21½	Asama	9,750
21½	*Tokiha*	
21	*Azuma*	9,435
20	*Yakumo*	9,850
21	2 Unnamed ...	9,750
	6 ships.	

* 2 projected. † C 9, C 10 projected. ‡ 4 projected.

Table VI.—Second-Class Cruisers.

GREAT BRITAIN.

Speed.	Name.	Displacement.
kts.		tons.
16	Aurora	
16	Australia... ...	
16	Galatea	
16	Immortalité ...	5,600
16	Narcissus... ...	
16	Orlando	
16	Undaunted ...	
17	Amphion... ...	
17	Arethusa... ...	
17	Leander	4,300
17	Phaeton	
17	Forth	
17	Mersey	
17	Severn	4,050
17	Thames	
19	Astræa	
19½	Bonaventure ...	
19½	Cambrian... ...	
19½	Charybdis ...	
19½	Flora...	4,360
19½	Forte...	
19½	Fox	
19½	Hermione... ...	
19¾	Æolus	3,600
20	Andromache ...	3,400
20	Apollo	3,400
19¾	Brilliant	3,600
19¾	Indefatigable ...	3,600

FRANCE.

Speed.	Name.	Displacement.
kts.		tons.
18	Bruix	4,679
18	Chanzy	4,855
18	Charner	4,716
18	Latouche Tréville	4,681
19	Pothuau	5,275
19	Cecille	5,839
19	Tage	7,469
19½	Alger	4,313
19	Isly	4,406
19	Jean Bart... ...	4,044
19½	Bugeaud	3,681
19½	Chasseloup-Laubat... ...	3,699
19½	Friant	3,680
19½	Pascal	3,925
19	Descartes... ...	
17	Sfax	4,561
20	Suchet	3,281
19	Cassard	
19	D'Assas	3,890
19	Duchayla... ...	
19	Catinat	4,011
19	*Protet*	4,048
23	*Jurien de la Gravière* ...	5,413
23	*H 4*	4,000
23	*H 5*	

RUSSIA.

Speed.	Name.	Displacement.
kts.		tons.
16	Dimitri Donskoi	5,882
15	Vladimir Monomach	6,061
14	Minin	6,136
15	Getzog Edinburgski	5,050
14	General Admiral	4,722
17½	Admiral Korniloff ...	5,817
20	Svietlana	3,828

ITALY.

Speed.	Name.	Displacement.
kts.		tons.
19	Marco Polo ...	4,527
20	Vesuvio	3,373
18	Etna	3,474
17½	Fieramosca ...	3,542
19	Stromboli... ...	3,420

GERMANY.

Speed.	Name.	Displacement.
kts.		tons.
20	Gefion	4,044
20	Irene...	4,330
19	Prinzess Wilhelm ...	
21	Freya	
21	Hansa	
21	Hertha	5,561
21	Victoria Luise	
21	Vineta	

UNITED STATES.

Speed.	Name.	Displacement.
kts.		tons.
20	Albany	3,600
20	Baltimore... ...	4,413
18	Charleston ...	3,730
18	Chicago	4,500
19	Newark	4,098
20	New Orleans ...	3,600
21½	Olympia	5,800
19½	Philadelphia ...	4,324
19	Cincinnati ...	3,213
19	Raleigh	
19½	San Francisco...	4,098

JAPAN.

Speed.	Name.	Displacement.
kts.		tons.
17	Hashidate ...	
17	Itsukushima ...	4,277
17	Matsushima ...	
18½	Naniwa	3,700
18½	Takachiho ...	
22	Chitose	4,760
22	Kasagi	
24	Takasago... ...	4,300
23	Yoshino	4,180

19⅝	Intrepid	3,600							
19⅝	Iphigenia	3,600							
20	Latona	3,400							
20	Melampus ...	3,400							
20	Naiad	3,400							
19⅝	Pique	3,600							
19⅝	Rainbow	3,600							
19⅝	Retribution ...	3,600							
20	Sappho	3,400							
20	Scylla	3,400							
19⅝	Sirius	3,600							
19⅝	Spartan	3,600							
20	Sybille	3,400							
20	Terpsichore ...	3,400							
20	Thetis	3,400							
20	Tribune	3,400							
19½	Diana	5,600							
19½	Dido								
19½	Doris...								
19½	Eclipse								
19½	Isis								
19½	Juno								
19½	Minerva								
19½	Talbot								
19½	Venus								
19	Arrogant	5,800							
19	Furious								
19	Gladiator								
19	Vindictive ...								
20	*Hermes*	5,600							
20	*Highflyer*								
20	*Hyacinth*								
	60 ships.*		26 ships.	7 ships.	5 ships.	8 ships.	11 ships.†	9 ships.	

* 3 projected.

† 3 projected.

TABLE VII.—THIRD-CLASS CRUISERS.

GREAT BRITAIN.			FRANCE.			RUSSIA.			ITALY.			GERMANY.			UNITED STATES.			JAPAN.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.
18	Iris	3,730	18	Milan	1,733	15	Rynda	3,508	21	Piemonte	2,500	16	Blitz	1,360	15½	Atalanta	3,000	20	Akashi	2,700
18	Mercury		19½	Costlogon	1,901	15½	Pamyat Merkuria ...	3,000	19	Calabria	3,508	16	Pfeil		15½	Boston		19	Akitsushima ...	3,150
16½	Fearless	1,580	20½	Cosmao	1,923	25	*Novik**	3,000	19½	Dogali	2,055	16½	Buzzard	1,827	18½	Detroit		18	Idzumi	2,950
16¾	Scout...		20½	Forbin	1,791				18	Elba	2,690	16	Condor		18½	Marblehead ...	2,089			
16½	Archer		20½	Lalande	1,895				17½	Giovanni Bausan	2,922	16	Cormoran	1,614	18½	Montgomery ...				
16½	Brisk...		20½	Surcouf	2,012				19	Etruria		16	Geier							
16½	Cossack		20½	Troude	1,994				21	Lombardia ...	2,245	16	See-Adler ...							
16½	Mohawk	1,770	20	Davout	2,979				18	Liguria		15½	Falke	1,703						
16½	Porpoise		20	Linois	2,308				18	Umbria		23	Greif...	1,971						
16½	Racoon		20	Galilée	2,280				20	Puglia	2,550	23	Hela							
16½	Tartar		20	Lavoisier								21	*Gazelle*	2,650						
17	Alacrity	1,700	20½	*D'Estrees*	2,413							20	*A*	2,600						
17	Surprise		20½	*Infernet*								20	*B*	2,800						
17¾	Barham	1,830																		
17¾	Bellona																			
16½	Barracouta ...																			
16¾	Barrosa	1,580																		
16¾	Blanche																			
16¾	Blonde																			
19	Magicienne ...																			
19	Marathon ...	2,950																		
19	Melpomene ...																			
19	Medea	2,800																		
19	Medusa																			
19	Pallas																			
19	Pearl																			
19	Philomel																			
19	Phœbe																			
19	Katoomba ...	2,575																		
19	Mildura																			
19	Ringarooma ...																			
19	Tauranga... ...																			
19	Wallaroo... ...																			
20½	Pelorus																			
20	Proserpine ...																			
20	Pactolus																			
20	Pegasus																			
20	Perseus	2,135																		
20	Pomone																			
20	Prometheus ...																			
20	Psyche																			
20	*Pyramus*... ...																			
20	*Pandora*	2,200																		
20	*Pioneer*																			
	44 ships.			13 ships.			6 ships.			10 ships.			13 ships.			5 ships.			3 ships.	

* 9 others of this class are said to be included in the programme.

TABLE VIII.—GUNBOATS.

GREAT BRITAIN.			FRANCE.			RUSSIA.			ITALY.			GERMANY.			JAPAN.			UNITED STATES.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.						
19	Grasshopper		17¾	Condor	1220	20	Captain Sacken	742	20	Aretusa	833	19	Jagd	1230						
19	Sandfly	525	17	Epervier	1268	20	Lieutenant Ilyn	714	20	Calatafimi ...	833	19	Wacht							
19	Spider		17¼	Faucon	1220	22	Gaidamak ...		21	Caprera	833	22½	Komet	931						
18½	Rattlesnake ...	550	18	Fleurus	1289	22	Vzadnik	400	17	Conflenza	768	21	Meteor							
20	Assaye		17¼	Vautour	1220	22	Griden		20	Euridice	833									
20	Boomerang ...		18½	Wattignies ...	1272	21	Kazarsky... ...		19	Goito...	812									
20	Gleaner		18½	Bombe	413	22	Posadnik	462	19½	Iride	833									
19	Gossamer		18	Couleuvrine ...	428	22	Voevada	448	19	Minerva	833									
20	Karrakatta ...		18	Dague	402	21	Abrek	535	19	Montabello ...	814									
20	Plassy		18	Dragonne... ...	403				19	Monzambano ...	840									
20	Salamander ...	735	18	Flèche	418				19	Partenope... ...	833									
20	Seagull		18	Lance	395				18	Tripoli	848									
20	Sharpshooter ...		18	Sainte-Barbe ...	430				20	Urania	833									
20	Sheldrake ...		18	Salve...	406				20	Saetta	400									
20	Skipjack		18¾	Léger	509				20	Folgore	370									
20	Spanker		18½	Lévrier	497				22	*Agordat*	1292									
20	Speedwell... ...		21½	Casabianca ...	945				26	*Coatit*										
19	Alarm		21½	Cassini	943															
19	Antelope		21½	D'Iberville ...	952															
19	Circe		23	Dunois	882															
19	Hebe		23	Lahire																
19	Jaseur																			
20	Jason...	810																		
19	Leda																			
19	Niger																			
19	Onyx																			
19	Renard																			
20½	Speedy																			
19	Dryad																			
19	Halcyon																			
19	Harrier	1070																		
19	Hazard																			
19	Hussar																			
18	Polyphemus ...	2640																		
	34 ships.			21 ships.			9 ships.			17 ships.			4 ships.							

CHAPTER IV.

The United States Navy.

After the Civil War.

For fifteen years after the Civil War, 1861–65, but little attention was paid to building ships for the Navy. The then formidable fleet of monitors, steam frigates, cruisers, etc., was considered to be sufficient. The monitor was believed to be the only type for an efficient armoured vessel, and the large calibre smooth-bore gun was persistently claimed to be superior to rifled ordnance on the principle that the destructive effect of a series of crushing blows by large massive shot would be much greater than mere penetration by rifle projectiles. This fine fleet of wooden steam frigates and cruisers, built during the latter part of the war mostly of unseasoned timber, soon became unserviceable. In 1874 there was a spasmodic effort to build a few cruisers, and to some extent modernise some of the old vessels by practically building new vessels under the head of repairs. This resulted in giving the Navy the following new wooden and iron steam vessels fitted with full sail power and able to make an average speed of 11 knots: Trenton, 3900 tons; Vandalia, 2100 tons; Quinnebaug, Swatara, Galena, Marion and Mohican, each of 1900 tons; Adams, Alliance, Enterprise, Essex and Nipsic, each of 1375 tons; and the iron steamers Alert, Huron and Ranger, each of 1020 tons. Besides these, the unarmoured ram Alarm was built largely as an experiment, and five large twin-screw armoured double-turreted monitors, the Puritan, 6000 tons, and the Miantonomoh, Amphitrite, Monadnock and Terror, of 3990 tons, were laid down in 1874, but owing to the failure of Congress to appropriate for continuing their construction they were left unfinished. In 1887 Congress authorised their completion, in accordance with which the Miantonomoh was finished in 1891 and the others in 1895 and 1896.

This effort to increase the Navy during the centennial period thus gave the Navy twenty-one new vessels, but they were barely sufficient to replace the older ships that had become unseaworthy. Another decade was allowed to pass without any increase in the Navy.

In 1881 an Advisory Board of naval officers and civilian experts was appointed to report on the needs of the Navy. This board found the steel shipbuilding industry in the United States in its infancy, and considering the limited facilities of the shipyards at that time, only recommended the building of three protected cruisers and one dispatch vessel. These were laid down in November, 1883, and first put in commission at the following dates, viz.:— Advisory Board, 1881.

Chicago,	4500 tons,	5000 horse-power,	14	knots,	in	April,	1887.
Boston,	3189 „	3785	„	14	„	„	May,	1887.
Atlanta,	3189 „	3350	„	16·3	„	„	July,	1886.
Dolphin,	1486 „	2253	„	14·5	„	„	Dec.,	1885.

The contracts called for the completion of these vessels in a period of eighteen months after signing the contract, but owing to inexperience, changes, and other delays, they were not ready for service until the above dates.

The success in building these four vessels stimulated private enterprise and encouraged the erection of large steel works for the production of the necessary material for ship construction, armour and armament. The Bethlehem Iron Company and the Newport News Shipbuilding Company were established chiefly for supplying the demand for the creation of a modern Navy. The labours of the Advisory Board educated the people to some extent to the necessities of the time, but there was no systematic or continuing naval policy such as that by which Germany has been building and gradually increasing her naval power.

In July, 1890, the Secretary of the Navy appointed a Naval Policy Board, which recommended that the United States Navy should consist of 100 vessels, viz., twenty first-class battleships, twenty coast-defence vessels, and sixty cruisers, to be completed within a period of ten years; these proposed sixty cruisers would at the present time have comprised at least ten armoured cruisers, twenty first-class and 30 second-class cruisers. The strength proposed is much greater than the present strength of the United States Navy, counting only effective fighting vessels and discarding all small craft, torpedo-boats and auxiliary vessels. The recommendations of the Naval Policy Board were not adopted, and at each session of Congress there has been a hard struggle to obtain authority to build new vessels. Those which have been built were constructed by contract, so that after having been commenced the Government was obliged to complete them, and thus the long delay experienced in the building of the five monitors is not likely to be repeated. Naval Policy Board, 1890.

The growth of the Navy in the last ten years is illustrated by the

following table showing the number of modern vessels built and building:—

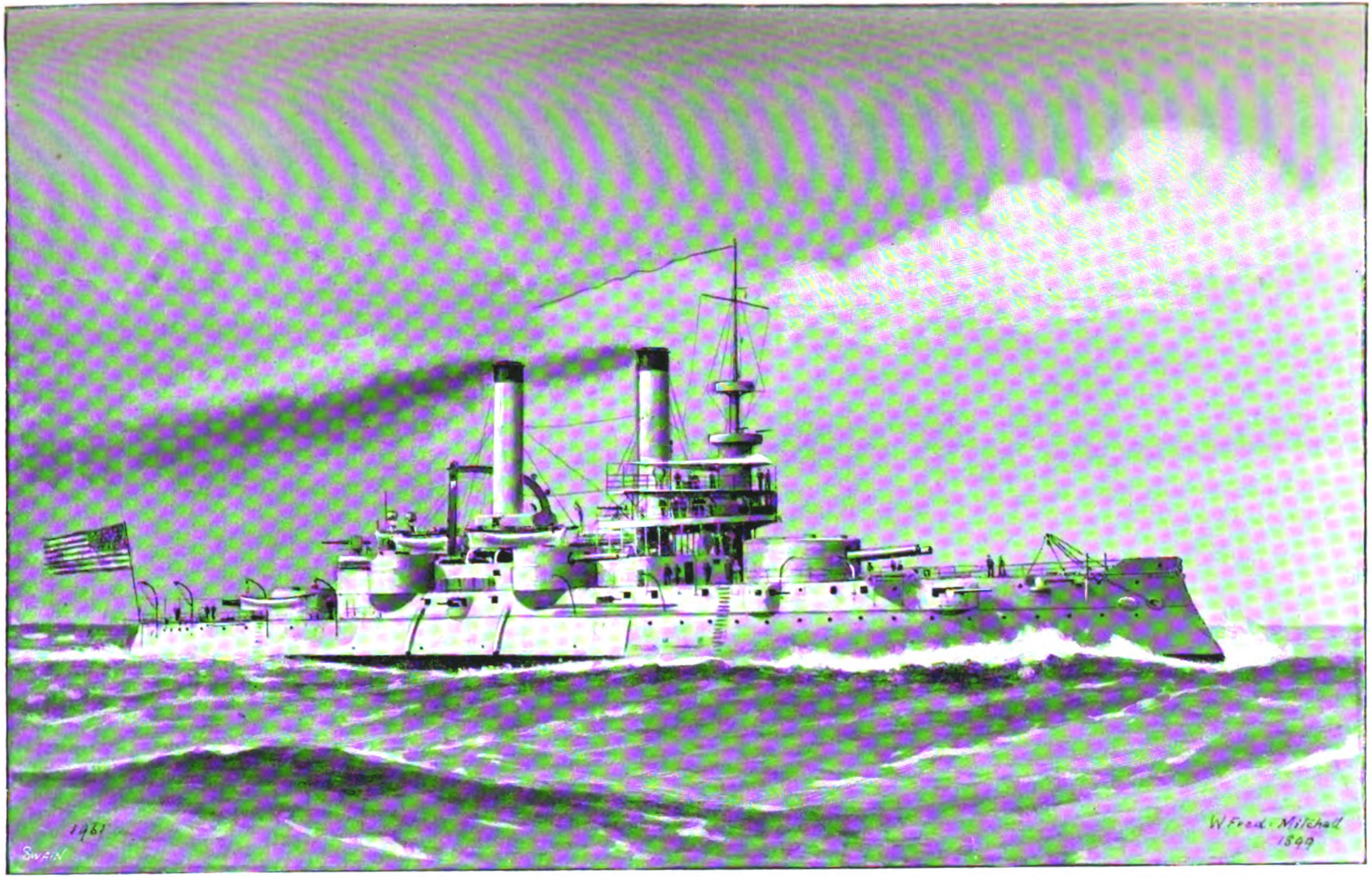
—	January 1, 1889.		January 1, 1899.	
	Built.	Building.	Built.	Building.
First-class Battleships	0	0	4	8
Second-class Battleships	0	2	1	0
Armoured Coast Defence Vessels	1	5	7	4
Armoured Cruisers	0	0	2	0
Protected Cruisers above 4,000 tons	1	4	8	0
Protected Cruisers from 2,000 to 4,000 tons	2	1	10	1
Small Cruisers, Gunboats, etc.	2	5	18	1
Torpedo-boat Destroyers	0	0	0	16
Torpedo Boats	0	1	18	10
Total	6	18	68	40

Naval Ordnance.

The Board of Naval Ordnance took the lead in developing the armament and armour for modern ships. The Washington navy yard was converted into a gun factory exclusively in 1885, and rifled guns designed by American naval officers have been constructed at that factory since 1880, though the steel forgings for guns larger than 6 inches in calibre had to be procured from abroad until 1889, when the Bethlehem Iron Company delivered the first lot of steel forgings in accordance with their contract. Private firms erected plants for manufacture of secondary batteries and small arms, at the same time keeping pace with the gradual naval progress of the last decade.

The following table shows the progress in the manufacture of naval guns in the United States:—

Calibre of Guns.	Number completed January 1st, 1889.	Number completed January 1st, 1899.
13-inch, 35 calibres	0	29
12 „ 35 „	0	14
10 „ 30 „	3	24
10 „ 35 „	0	2
8 „ 30 „	5	9
8 „ 35 „	3	65
8 „ 40 „	0	2
6 „ 30 „	24	123
6 „ 35 „	0	6
6 „ 40 „	0	43
5 „ 30 „	2	2
5 „ 40 „	0	171
5 „ 50 „	0	0
4 „ 40 „	0	130
Total	37	620



"IOWA,"

UNITED STATES BATTLESHIP.

On January 1st, 1899, there were 170 improved modern rifled guns in the course of construction. The secondary battery armaments supplied to vessels on January 1st, 1899, numbered 1,023 guns, viz: 2 14-prs., 472 6-prs., 62 3-prs., 233 1-prs., 39 37 mm. Hotchkiss, 2 47 mm. Hotchkiss, 140 machine guns, and 73 field guns. Semi-automatic 6-prs. are being constructed and improvements are being made in the details of all guns.

The torpedo station at Newport, R.I., has developed and improved the torpedo armaments and submarine mines. Smokeless powder has recently been adopted exclusively. Its manufacture was first started at Newport, R.I., and now a special plant for its manufacture in large quantities is being erected at the naval ordnance proving ground at Indian Head, Maryland.

Administration.

The President of the United States is the Commander-in-Chief of the Army and Navy.

The Executive Department of the Navy at Washington is administered by a Secretary of the Navy (usually a civilian), appointed by the President as a member of his cabinet for the term of four years. An Assistant Secretary of the Navy, likewise appointed by the President, exercises a general supervision over the Bureaus of the Navy Department and their subordinate branches, and he performs such other specific duties as may be required by the Secretary. The business is distributed among the following bureaus and offices.

The Bureau of Navigation.
The Bureau of Ordnance.
The Bureau of Construction and Repair.
The Bureau of Steam Engineering.
The Bureau of Supplies and Accounts.
The Bureau of Yards and Docks.
The Bureau of Medicine and Surgery.
The Office of the Judge Advocate-General.
The Hydrographic Office
The Office of Naval Intelligence.

The Chiefs of the Bureaus are appointed from officers of the Navy, of or above the rank of Commander or relative rank of Commander. They are commissioned by and with the advice and consent of the Senate for terms of four years. All the Chiefs of Bureaus have the

relative rank of Commodore while holding office. They each have charge of the records and accounts of their own bureaus, their duties are performed under the authority of the Secretary of the Navy, and their orders have full force and effect as emanating from him.

The Judge Advocate-General, under the direction of the Secretary of the Navy, receives, revises, and records the proceedings of naval courts and boards for the examination of officers for promotion and retirement. His duties are those of the solicitor and law officer of the department in details of claims arising from collisions between naval and other vessels, those from contracts and in general all legal matters. The present incumbent is a Lieutenant in the Navy having the rank of Captain while Judge Advocate-General.

The Hydrographic Office is at present in charge of a Commander in the Navy, under the Bureau of Equipment, and has charge of surveys, publication of charts, sailing directions and books, and dissemination of nautical information to the Navy and mercantile marine.

The Office of Naval Intelligence at present in charge of a Commander in the Navy, collects, classifies, and discusses information from abroad concerning foreign navies, resources and coast defences, and studies their strategic value in connection with their preparedness for war.

The Bureau of Navigation has general charge of the navy *personnel*, detail of officers and men, enlistments and discharges, discipline, education, training and drill, the promulgation and enforcement of the circulars, regulations and orders of the Secretary of the Navy, preparation and revision of drill books, tactics, signal and cipher codes, regulations concerning uniform and service afloat. It keeps the records of service of all squadrons, ships, officers and men, and publishes the annual Navy Register. It has charge of the Naval Academy, apprentice establishment and technical schools; prepares the estimates for the pay of the *personnel*, has direction over all rendezvous and receiving ships, and provides transportation for enlisted men.

The Bureau of Equipment has charge of all that relates to the equipment of ships according to the allowance tables in force. It has the manufacturing of rope, anchors, cables, rigging, sails, galley and cooking utensils, installation and repair of all electrical appliances on shipboard, supplies water, coal and fuel for steaming, heating and lighting, and has charge of the Naval Observatories, the Nautical Almanac and Compass Offices, and general supervision over the Hydrographic Office.

The Bureau of Ordnance has charge of the Gun Factory, torpedo

stations and magazines on shore. It provides for the manufacture of guns, small arms, torpedoes, ammunition and explosives, the necessary machinery, material, apparatus and supplies for the weapons; conducts the tests of material, including armour, guns and ammunition; recommends the armament to be carried on board ship, the methods for handling and transporting ammunition and torpedoes; confers with the Bureau of Construction and Repair on the location and thickness of armour, the design and construction of turret ammunition hoists and arrangements for centering turrets and character of roller paths.

The Bureau of Construction and Repair has charge of designing, building, fitting, and repairing hulls of ships, turrets, spars, capstans, steering gear, ventilating apparatus, and, after consulting with the Bureau of Ordnance, the location and construction of ammunition hoists, with their machinery and appurtenances, the placing and securing the armour and the armament on board ship to the satisfaction of the Bureau of Ordnance. This Bureau has charge of the care and preservation of ships in reserve, and the docking of ships.

The Bureau of Steam Engineering has charge of all that relates to designing, building, fitting and repairing steam machinery used for propulsion of ships, or for working turrets, steam-pumps, heating and distilling apparatus, with all steam connections throughout the ship.

The Bureau of Supplies and Accounts has charge of supplies of provisions, clothing, fresh water for drinking and cooking purposes, and purchases all supplies for the Navy, except medicines and surgical appliances and instruments, and supplies for the Marine Corps.

The Bureau of Yards and Docks has charge of all docks, slips, wharves, piers, landings, roads, railways, vehicles, horses, oxen, and teams; all buildings within the limits of navy yards and stations, their furniture, heating and lighting, except naval hospitals, magazines and the torpedo station at Newport. It provides derricks, shears, and cranes, as well as the clerical staff, messengers, labourers, and watchmen for the Commandant, Captain and Civil Engineer of navy yards and stations.

The Bureau of Medicine and Surgery has charge of naval hospitals, dispensaries and laboratories, and purchases all supplies, medicines, and instruments for the medical department of the Navy.

Each Bureau superintends all work done under it, designs buildings for its use, requisitions for its tools, stationery and appliances; has control over the organisation and muster of the employees for its own purposes. All orders relating to navy yard business connected with a bureau, must be given by the Chief of the Bureau to the Commandant, who shall be responsible for their execution.

There are a number of Boards of officers, more or less permanent, which advise the Secretary of the Navy and Bureau Chiefs.

The Board of Construction is composed of the Chiefs of the Bureaus of Ordnance, Equipment, Construction and Repair and Steam Engineering, and the Chief Intelligence Officer. The duties of this Board are to advise the Secretary of the Navy on new constructions, refits, and general ship-building policy.

The Boards for the examination of officers for promotion and retirement are composed of officers specially detailed for that purpose, all officers of the Navy being obliged to pass examinations, professionally, morally, and physically, before they can be promoted.

The Board of Inspection and Survey is composed of a detail of eight naval officers, and is charged with the duty of inspecting all naval vessels, at periods during construction and when fitting out, and returning from a cruise. It is specially detailed to conduct the steam trials of vessels built by contract.

There are special Boards of Survey under the Bureaus of Ordnance, Equipment, Construction and Steam Engineering, which examine material and articles purchased or manufactured under each Bureau.

Boards of Investigation, Courts of Inquiry, Summary and General Courts Martial, are ordered as occasion demands for administration of justice.

Personnel.

The U.S. Navy *personnel* on the active list is composed of 1,372 Commissioned officers, 182 Warrant officers, 12,750 enlisted men, and 1,000 Naval apprentices, 3rd class; and the U.S. Marine Corps. The number of commissioned officers and men is established by law. The number of officers and their relative rank are given opposite, and their pay in the table on page 98.

The line officers, engineers, naval constructors, and marine officers, are recruited from the graduates of the U.S. Naval Academy at Annapolis, Md. There are allowed at the academy one naval cadet for every member or delegate of the House of Representatives; one for the District of Columbia, and ten at large. The candidate from the District of Columbia and the ten at large are selected by the President. The Candidates must be between 15 and 20 years of age, and pass a physical and mental examination. The course of study is four years at the Naval Academy, and two years at sea. At the beginning of the fourth year at the academy the naval cadets are separated into two divisions in proportion to the vacancies in the lowest grades of the line and marine corps, and the engineer corps.

The cadets selected for their special fitness for the line and marine corps, thereafter pursue a course of study for service as line officers, while the others pursue a separate course to fit them for service in the engineer corps. All graduates of the academy could be assigned to either, and officers of the line and engineer corps have on their own application been transferred from the engineer corps to the line, and vice versâ.

LINE OFFICERS.	MEDICAL OFFICERS.	PAYMASTERS.	ENGINEERS.'	NAVAL CONSTRUCTORS.	RELATIVE ARMY RANK.
6 Rear-Admirals	...	...	...	...	Maj.-Gen.
10 Commodores	...	...	...	...	Brig.-Gen.
45 Captains	15 Medical Directrs.	13 Pay Directors	11 Chief Engrs.	2 N.C.'s.	Colonel.
85 Commanders	15 „ Inspctrs.	13 Pay Inspectors	15 „ „	3 „	Lieut.-Col.
74 Lt. Commanders	1 Surgeon	20 Paymasters	8 „ „	...	Major.
250 Lieutenants	49 Surgeons	20 „	36 „ „	12 „	Captain.
75 „ Jr. Grade	57 Passed Asst. Surgs.	20 Passed Asst. Paymrs.	66 Passed Asst. Engrs.	20 Asst. N.C.'s.	1st Lieut.
[illegible]1 Ensigns	33 Asst. Surgeons.	25 Asst. Paymasters	59 Asst. Engrs.	...	2nd Lieut.
[illegible]2 Naval Cadets	...	...	22 Naval Cadet Engrs.	...	Cadets.

24 Chaplains, 4 with relative rank of Captain
7 „ „ „ Commander
13 „ „ „ Lieutenant.
12 Professors of Mathematics, 3 with relative rank of Captain
4 „ „ „ Commander
5 „ „ „ Lieutenant.
13 Civil Engineers, 1 with relative rank of Captain
2 „ „ „ Commander
3 „ „ „ Lieutenant Commander
4 „ „ „ Lieutenant
3 „ „ „ Lieutenant, Jr. Grade.

WARRANT OFFICERS.

44 Boatswains.
51 Gunners.
50 Carpenters.
14 Sailmakers.
23 Mates.

Naval Cadets who show special fitness for the construction corps are given opportunity to pursue a special post graduate course in naval construction. Heretofore these naval cadets, usually one or two from each class, have been sent abroad to England and France; but hereafter this post graduate course of study will be pursued at Annapolis, Md.

The Medical Corps is recruited from graduates of medical colleges. They must be between 21 and 26 years of age, and pass a physical and professional examination before a board of medical officers.

Assistant Paymasters are appointed from civil life. They must be between 21 and 26 years of age, and pass a physical and professional examination.

Chaplains are appointed from civil life. They must be between the ages of 21 and 35 years, and pass a physical examination only, but they must be regularly ordained ministers of good standing in their denomination.

NAVY PAY TABLE.

Rank.	At sea.	On shore duty.	On leave or waiting orders.
REAR-ADMIRALS	$6,000	$5,000	$4,000
COMMODORES	5,000	4,000	3,000
CAPTAINS	4,500	3,500	2,800
COMMANDERS	3,500	3,000	2,300
LIEUTENANT-COMMANDERS—			
First four years after date of commission	2,800	2,400	2,000
After four years from date of commission	3,000	2,600	2,200
LIEUTENANTS—			
First five years after date of commission	2,400	2,000	1,600
After five years from date of commission	2,600	2,200	1,800
LIEUTENANTS (Junior Grade)—			
First five years after date of commission	1,800	1,500	1,200
After five years from date of commission	2,000	1,700	1,400
ENSIGNS—			
First five years after date of commission	1,200	1,000	800
After five years from date of commission	1,400	1,200	1,000
NAVAL CADETS*	500	500	500
MATES	1,200	900	700
MEDICAL AND PAY DIRECTORS AND MEDICAL AND PAY INSPECTORS AND CHIEF ENGINEERS, HAVING THE SAME RANK, AT SEA	4,400	. .	. .
FLEET SURGEONS, FLEET PAYMASTERS, AND FLEET ENGINEERS	4,400	. .	. .
SURGEONS, PAYMASTERS, AND CHIEF ENGINEERS—			
First five years after date of commission	2,800	2,400	2,000
Second five years after date of commission	3,200	2,800	2,400
Third five years after date of commission	3,500	3,200	2,600
Fourth five years after date of commission	3,700	3,600	2,800
After twenty years from date of commission	4,200	4,000	3,000
PASSED ASSISTANT SURGEONS AND PASSED ASSISTANT PAYMASTERS—			
First five years after date of appointment	2,000	1,800	1,500
After five years from date of appointment	2,200	2,000	1,700
PASSED ASSISTANT ENGINEERS—			
First five years after date of appointment	2,000	1,800	1,500
Second five years after date of appointment	2,200	2,000	1,700
Third five years after date of appointment	2,450	2,250	1,900
Fourth five years after date of appointment	2,700	2,350	1,950
ASSISTANT SURGEONS, ASSISTANT PAYMASTERS, AND ASSISTANT ENGINEERS—			
First five years after date of appointment	1,700	1,400	1,000
After five years from date of appointment	1,900	1,600	1,200
NAVAL CONSTRUCTORS—			
First five years after date of appointment	. .	3,200	2,200
Second five years after date of appointment	. .	3,400	2,400
Third five years after date of appointment	. .	3,700	2,700
Fourth five years after date of appointment	. .	4,000	3,000
After twenty years from date of appointment	. .	4,200	3,200
ASSISTANT NAVAL CONSTRUCTORS—			
First four years after date of appointment	. .	2,000	1,500
Second four years after date of appointment	. .	2,200	1,700
After eight years from date of appointment	. .	2,600	1,900
CHAPLAINS—			
First five years after date of commission	2,500	2,000	1,600
After five years from date of commission	2,800	2,300	1,900
PROFESSORS OF MATHEMATICS AND CIVIL ENGINEERS—			
First five years after date of appointment	2,400	2,400	1,500
Second five years after date of appointment	2,700	2,700	1,800
Third five years after date of appointment	3,000	3,000	2,100
After fifteen years from date of appointment	3,500	3,500	2,600
BOATSWAINS, GUNNERS, CARPENTERS, AND SAILMAKERS—			
First three years after date of appointment	1,200	900	700
Second three years after date of appointment	1,300	1,000	800
Third three years after date of appointment	1,400	1,300	900
Fourth three years after date of appointment	1,600	1,300	1,000
After twelve years from date of appointment	1,800	1,600	1,200

* After leaving Academy, *at sea*, in other than practice ships, $950 per annum.

NOTE.—From and after July 1, 1870, the spirit ration is totally abolished, and in lieu thereof the Navy ration, under the appropriation of provisions for the Navy, is 30 cents per day.

Provided, That no officer on the retired list of the Navy shall be employed on active duty except in time of war; *And provided*, That those officers on the retired list, and those hereafter retired, who were, or who may be, retired after forty years' service, or on attaining the age of sixty-two years, in conformity with section one of the act of December, eighteen hundred and sixty-one, and its amendments dated June twenty-fifth, eighteen hundred and sixty-four, or those who were or may be retired from incapacity resulting from long and faithful service, from wounds or injuries received in the line of duty from sickness or exposure therein, shall, after the passage of this act, be entitled to seventy-five per centum of the present sea pay of the grade or rank which they held at the time of their retirement. The rear-admirals provided for in the act of June fifth, eighteen hundred and seventy-two, shall be considered as having been retired as rear-admirals. [Act 3d March, 1873.]

Professors of Mathematics and Civil Engineers are selected by the President, and must pass the physical and professional examinations.

Warrant Officers and Mates are appointed by the Secretary of the Navy, preference being given to men who have been honourably discharged after service as naval apprentices and re-enlistment for 3 or more years. They must be between the ages of 21 and 35 years, and must pass the required examinations, and after serving one year under acting appointment satisfactorily, they receive warrants as Boatswains, Gunners, Carpenters, Sailmakers and Mates.

Every person appointed to any office in the Navy must be a citizen of the United States, and pass the required physical, mental and professional examinations.

Paymasters' clerks are appointed for a ship's commission by the Secretary of the Navy on nomination by the Paymaster with whom he is to serve.

The Petty Officers and enlisted men of the Navy are classified as follows:— Petty officers.

PETTY OFFICERS, ENLISTED MEN, ETC.

CLASSIFICATION AND PAY.

Chief petty officers.

Seamen branch.	Monthly Pay.	Artificer branch.	Monthly Pay.	Special branch.	Monthly Pay.
Chief Masters-at-Arms . . .	$65	Chief Machinists	$70	Chief Yeomen . . .	$60
Chief Boatswains' Mates . .	50	Chief Carpenters' Mates . .	50	Hospital Stewards . .	60
Chief Gunners' Mates . . .	50	Chief Electricians	50	Bandmasters . . .	52
Chief Gun Captains	50				
Chief Quartermasters . . .	50				

Petty officers, first class.

Masters-at-Arms, first class .	$40	Machinists, first class . . .	$55	First Musicians . . .	$36
Boatswains' Mates, first class .	40	Boilermakers	60	Yeomen, first class . .	40
Gunners' Mates, first class . .	40	Coppersmiths	50		
Gun Captains, first class . .	40	Blacksmiths	50		
Quartermasters, first class . .	40	Plumbers and Fitters . . .	45		
Schoolmasters	40	Sailmakers' Mates	40		
		Carpenters' Mates, first class .	40		
		Water Tenders	40		
		Electricians, first class . . .	40		

Petty officers, second class.

Masters-at-Arms, second class .	$35	Machinists, second class . .	$40	Yeomen, second class .	$35
Boatswains' Mates, second class	35	Oilers	37		
Gunners' Mates, second class .	35	Carpenters' Mates, second class	35		
Gun Captains, second class . .	35	Printers	35		
Quartermasters, second class .	35	Electricians, second class . .	35		

Petty officers, third class.

Seamen branch.	Monthly Pay.	Artificer branch.	Monthly Pay.	Special branch.	Monthly Pay.
Masters-at-Arms, third class	$30	Carpenters' Mates, third class	$30	Writers, third class	$30
Coxswains (1)	30	Painters	30		
Gunners' Mates, third class	30				
Quartermasters, third class	30				

Seamen, first class.

Seamen Gunners	$26	Firemen, first class	$35	Musicians, first class	$32
Seamen	24				
Apprentices, first class	21				

Seamen, second class.

Ordinary Seamen	$19	Firemen, second class	$30	Musicians, second class	$30
Apprentices, second class	15	Shipwrights	25	Buglers	30
		Sailmakers	25		

Seamen, third class.

Landsmen	$16	Coal Passers	$22	Baymen	$18
Apprentices, third class	9				

Messmen Branch.

Stewards to Commanders-in-Chief	$45	Steerage Cooks	$22
Cooks to Commanders-in-Chief	40	Warrant Officers' Stewards	24
Stewards to Commandants	45	Warrant Officers' Cooks	20
Cooks to Commandants	40	Ship's Cooks, 1st Class	35
Cabin Stewards	37	Ship's Cooks, 2nd Class	30
Cabin Cooks	32	Ship's Cooks, 3rd Class	25
Wardroom Stewards	37	Ship's Cooks, 4th Class	20
Wardroom Cooks	32	Mess Attendants	16
Steerage Stewards	25		

(1) Coxswains detailed as coxswains of steam launches, or as Coxswains to Commanders-in-Chief, shall receive $5 per month in addition to their pay.

(2) Seamen in charge of holds shall receive $5 per month in addition to their pay.

(3) Landsmen assigned to duty as Jacks-of-the-Dust, or as Lamplighters, shall receive $5 per month in addition to their pay.

(4) Any person who, after having enlisted in the Navy for a term of three years and received an honourable discharge or a recommendation for re-enlistment, upon the expiration of his term of service, re-enlists for three years within three months from the date of his discharge, shall receive an increase of $1 per month to the pay prescribed for the rating in which he serves for each consecutive re-enlistment.

Twenty cents per month is deducted from the pay due to each Officer, Seaman, and Marine in the Navy, to be applied to the funds for Naval Hospitals.

Apprentices.

Boys of good character between 14 and 17 years of age may, with the consent of their parents, enlist in the Navy until they are 21 years old. They must pass a physical examination and be able to read and write. They are received at the training station at Newport, R.I., and while there and in the training ships are third-class apprentices. The apprentices remain under instruction at Newport

for six months, after which they are transferred to the cruising training ships, in which they make a summer and a winter cruise. The boys are examined quarterly, and if found qualified they are transferred to the general service, where they are gradually promoted after serving six months in each grade if they pass the required examinations. Upon reaching 21 years of age they are discharged, and if they re-enlist within three months receive pay for the time they were out of the service.

Men are enlisted at prescribed rendezvous on board receiving ships and cruising ships for general service for periods of three years, honourably discharged men having certain privileges. On first enlistment in the Navy men must be over 18 and not over 25 years for landsmen, 30 years for seamen second-class, and 35 years for seamen first-class. Petty officers are selected from continuous service men, preferably seamen gunners and apprentices. Men holding permament appointments as petty officers may re-enlist as such.

It is customary for the executive officer of a ship to select and recommend men for petty officers' ratings according to their enlistment records and fitness. The Commanding officer issues Acting appointments to such men, and if, after one year or more service, these men prove to be qualified, they will receive permanent appointments, provided they shall have had at least three years' previous naval service and are citizens of the United States.

Young men, especially those who have served an apprenticeship in the Navy, are given special training to qualify as seamen gunners. Classes of such men are formed and sent to the gun factory at Washington and to the torpedo station for further instruction in ordnance and torpedoes. Men who qualify as first-class marksmen are selected from the crews of cruising ships and given special instruction as gun captains. They are eligible to promotion to the different classes of Petty officers, then to Chief Petty officers, from whom the corps of Warrant officers is recruited, thus affording a good career for deserving men. A certain amount of education is required, and all recruits must be able to read and write before they can be accepted.

Men are enlisted on board vessels of the Coast Survey for the cruise not to exceed five years, and for special service on receiving ships, tugs, &c., for one year.

The Bureau of Navigation fixes the complement of U.S. Navy vessels.

The Corps of Marines is a brigade subject to the laws and regulations of the Navy, except when detailed by order of the President for service with the Army, and is under the immediate command of the Marines.

Commandant at the headquarters of the Marine Corps at Washington, D.C. It comprises :

1 Colonel Commandant.
3 Majors and 2 Captains on the general staff.
1 Colonel.
2 Lieutenant Colonels.
4 Majors.
20 Captains.
30 First Lieutenants
10 Second Lieutenants.

viz., 71 officers and 2600 non-commissioned officers and privates.

The officers are recruited from the graduates of the Naval Academy, but they are governed by the rules and routine regulations of the U.S. Army.

Just previous to the war Congress authorised a permanent increase of the enlisted men of the marines by 473, making a total of 3073. A further temporary increase was allowed of 1640 men, making the strength of the Marines during the war 4713. Acting appointments for temporary service during the war were issued to 43 Second Lieutenants, making the total number of officers 114.

The Marines are assigned to duty at navy yards and stations, and detailed for the Marine Guard on board cruising vessels. They are posted as sentinels, and parade on occasions of ceremony, at funerals, etc. On board ship they serve the secondary battery and are posted as sharpshooters.

MARINE CORPS PAY TABLE.

Rank.	Pay per Annum.
Colonel Commandant	$3,500
Colonel	3,500
Lieutenant-Colonel	3,000
Major (Staff and Line)	2,500
Captain and Assistant Quartermaster	2,000
Captain	1,800
First Lieutenant	1,500
Second Lieutenant	1,400

NOTE.—All officers below the rank of Brigadier-General are entitled to 10 per cent., in addition to their current yearly pay as given above, for each and every period of five years' service, provided the total amount of such increase shall not exceed 40 per cent. of their current yearly pay ; and provided further that the pay of a Colonel shall not exceed $4,500 per annum, and that of a Lieutenant-Colonel $4,000 per annum. Officers on the retired list are entitled to 75 per cent. of pay (salary and increase) of their rank.

The contemplated reorganisation of the Navy *personnel* provides that naval officers shall receive, according to their relative Army

rank, the same pay and allowances as are now in force for the Marine Corps.

In the war with Spain the *personnel* was increased by appointing 856 officers for temporary service and by utilising the services of 225 retired officers, who relieved officers on shore stations that were ordered to duty afloat. The force of enlisted men was also increased to a total of 20,802 petty officers and men and 2,062 naval apprentices, or 22,868. An auxiliary naval force was also organised, chiefly from the naval militia of the several states, and amounted to 253 officers and 3,832 men. This force served in 41 vessels under the chief of the Auxiliary Navy, and also in some of the converted cruisers under command of regular naval officers. *Personnel in war with Spain.*

The U.S. Coast Signal Service was organised for the war and manned by 28 officers and 210 men of the naval milita, with men belonging to the Lighthouse Service, Weather Bureau and Life Saving Stations, a total force of 2,536 men at 233 stations. The crew of a coast signal station comprised 7 men and a telegraph operator. Each had a 90 ft. mast with a 40 ft. yard, and a small station-house. They were furnished with a complete signal outfit, codes, and telegraph and telephone instruments.

The strength of the U.S. Naval *Personnel* and Marines during the war with Spain was—officers, 2,706; men, 27,541, viz.:—

AUTHORISED REGULAR PEACE STRENGTH.

Commissioned Officers	1,372	Petty Officers and Men	12,750
Warrant Officers	182	Third-class Apprentices	1,000
Marine Officers	71	Marines	2,600
	1,625		16,350

TEMPORARY INCREASE FOR THE WAR.

Officers on the retired list	225	Men and Militia	8,052
Appointed Officers	771	Apprentices	1,026
Warrant Officers	42	Marines	2,113
Marine Officers	43		
	1,081		11,191

The authorised peace organisation and strength of the navy will be considerably modified during the next session of Congress before March 4th, 1899. The Chief of the Bureau of Navigation recommends that Congress authorise the enlistment of 20,000 men for general service and 2500 apprentices. The Commandant of Marines asks for an increase of 16 Quartermaster Sergeants and 1000 men, making a total of 4089 men for the peace establishment.

The enactment by Congress of the *Personnel* Bill providing for the amalgamation of the line and engineer corps will increase the

number of officers. This proposed law meets the approval of the Secretary of the Navy and the officers of the Navy. It is impossible to state exactly what Congress will do in this connection, but an increase in the authorised peace organisation and strength of the navy *personnel* will undoubtedly be authorised.

Navy Yards and Stations.

The United States Navy Yards are at Portsmouth, N.H.; Boston, Mass.; New York; League Island, Philadelphia; Washington; Norfolk; Pensacola, Florida; and Mare Island, California. The Naval Stations are at New London, Conn.; Newport, R.I.; Port Royal, S.C.; Key West, Fla.; and the Puget Sound Naval Station at Bremerton, Washington. The navy yards at New York, Norfolk and Mare Island are the chief shipbuilding yards, though most all the new vessels of the Navy are built by private shipbuilding firms, and after acceptance are sent to the navy yards for their armament and to be fitted out for service.

The administration of each navy yard is under the direction of a Commandant, usually a Rear-Admiral or Commodore at the most important. The Commandant exercises entire control over every department in the yard, and is responsible for the preservation of all buildings and stores and of all vessels in ordinary or repairing, and for judicious application of all labour.

The Captain of the yard, usually a Captain or Commander in the Navy, acts as the executive of the Commandant, with special direction and control of the police and fire departments, and acts as Commandant in his absence. He represents the Bureau of Yards and Docks when there is no civil engineer attached to the yard. He has charge of yard tugs, landings and all means of transportation and the employees for cleaning the yard. He has charge of all grounds, the vessels in ordinary, and all movements and moorings of vessels.

Officers in charge of Departments supervise and control all work pertaining to their respective bureaus, and have general charge and mustering of all persons employed by them. They make daily reports of labour and the cost of labour and material. They make requisition on the General Storekeeper for supplies and material needed. When ships are building the Ordnance Officer, Equipment Officer, Chief Engineer, Naval Constructor, Paymaster and Surgeon of the yard make monthly reports of the work done and weights put on board of any such vessels.

Labourers and skilled workmen are employed under each bureau, under the direction of the Officer in Charge of the Department, assisted by junior officers, quartermen, foremen and leading men. A labour board, composed of officers of the Navy, examines all applicants for employment and furnishes a list of such applicants, from which the Officers in Charge of the Departments select their workmen. The Paymaster of the Yard pays the wages of the employees twice a month, according to the pay-rolls certified by Officers in Charge of Departments, and payments are witnessed by an officer detailed by the Commandant. Navy yard employees are not considered as a part of the naval force, and are only employed for their specific duties at the navy yard. All employees are subject to perform duty in fire companies.

There are Receiving Ships at the navy yards at Boston; New York; League Island, Philadelphia; Norfolk; and Mare Island, Cal. The enlisted men temporarily serving on board of these ships are frequently called for by the Captain of the yard for service in moving and mooring ships and similar general work around the navy yard.

The Torpedo Station at Newport, R.I., is in charge of an officer detailed as Inspector of Ordnance, who supervises the manufacture and tests of torpedo armaments, explosives and accessories.

The Washington navy yard is devoted almost entirely to the manufacture of U.S. naval guns and is chiefly under the control of the Bureau of Ordnance. The Naval Proving Ground, at Indian Head, Md., is also under the Bureau of Ordnance.

The Naval Stations at Portsmouth, N.H.; New London, Conn.; Port Royal, S.C.; Key West, Fla.; Pensacola, Fla.; and Bremerton, Washington, are secondary establishments.

The Dry Docks at the Navy Yards and Naval Stations are as follows:—

Station.	Material of Construction.	Length on Floor.		Width of Entrance at Coping.		Depth over Sill at Mean High Water.		Rise of Tides.			
								Springs.		Neaps.	
		Ft.	Ins.	Ft.	Ins.	Ft.	Ins.	Ft.	Ins.	Ft.	Ins.
Portsmouth, N.H.	Wood	350	0	90	0	25	0	9	3	8	9
Boston, Mass.	Granite	367	$5\frac{1}{4}$	60	0	24	10	11	3	10	0
New York, N.Y.	Granite	338	3	66	0	25	3	5	0	4	0
" " "	Wood	459	10	85	0	25	6	5	0	4	0
" " "	Wood	626	8	105	$2\frac{7}{8}$	29	0	5	0	4	0
League Is., Pa.	Wood	459	10	85	0	25	6	7	0	5	9
Norfolk, Va.	Granite	302	9	60	0	25	0	3	0	2	6
" "	Wood	459	10	85	0	25	6	3	0	2	6
Port Royal, S.C.	Wood	459	0	97	0	26	0	7	3	6	6
Mare Is., Cal.	Granite	459	0	80	$6\frac{7}{8}$	27	6	5	3	4	9
Puget Sound, Wash.	Wood Body, Masonry Entrance	618	6	92	$7\frac{7}{8}$	30	0	10	0	6	0

In addition to these, the Naval Station at Newport includes the Apprentice Training Station and the Naval War College. The latter is an institution for the higher education of naval officers in the study of naval tactics, strategy, and latest developments in naval service, electricity, engineering, and warfare general.

The Naval Home at Philadelphia is an asylum for old retired seamen. There are Naval Hospitals at Portsmouth, N.H.; Boston, Mass.; Newport, R.I.; New York; Philadelphia, Washington; Norfolk; Mare Island; and Yokohama, Japan.

The Naval Station at San Juan, Porto Rico, just acquired, covers 4½ acres. It dates from 1800, and the value of the buildings is estimated at £16,000. The plans for the plant to be erected at this new U.S. Naval Station have not yet been completed.

Besides these shore stations, naval officers are assigned to duty under the U.S. Treasury Department, as chairmen and members of the Lighthouse Board, and as Lighthouse Inspectors in the 16 Lighthouse Districts of the United States, and in the Coast Survey.

Private Shipbuilding Yards.

The three private shipbuilding companies of Wm. Cramp & Co., Philadelphia, the Union Iron Works at San Francisco, and the Newport News Shipbuilding Co., are the largest private establishments in the United States capable of building large battleships.

Cramp's.

Cramp's shipyard at Philadelphia is the leading establishment in the country. The plant is capable of any work, and the ships built have proven to be of first-class workmanship. The battleships Alabama, Indiana, Iowa, Massachusetts, and the armoured cruisers New York and Brooklyn were built at this yard, besides seven of the larger cruisers, a number of cruisers for Russia and Japan, and the largest American merchant steamers.

Union Iron Works.

The Union Iron Works at San Francisco is likewise a first-class ship and engine-building yard where the largest vessels are built both for the navy and the mercantile marine. Among many others this yard built the battleships Ohio, Oregon, Wisconsin; the Monterey and the cruisers Charleston, Olympia and San Francisco, besides a number of smaller vessels for the Navy.

Newport News.

The Newport News Company is one of the largest and best equipped in the world. The yard occupies 200 acres of land, and has a water front of one mile, with deep water on the James River. It is a new modern establishment arranged to avoid unnecessary handling of material. There are three giant cantilever cranes, one of which, the "Hercules," swings on a diameter of 150 feet with 140

tons. The giant electric cantilever crane has an arm 111 feet above the water.

Among the tools in various parts of the plant are hammers, ranging from 600 to 6,000 pounds; lathes 126 in. swing, cylinder boring from 18 in. to 108 in. in diameter, planers to plane 222 inches vertically by 23 feet horizontally—24 in. slotting machines, riveters with pressure of 150 tons, immense hydraulic flangers, and rolls and travelling cranes. The machine shop is a building 500 feet long and 100 feet wide, with gallery on each side. The boiler shop is 300 feet long and 100 feet wide, and is equipped with cranes of 15, 40, and 100 tons. The fitting up shop is 320 feet long by 60 feet wide; it has a mould loft and an immense set of bending rolls 32 feet long, with a dead pressure of 850 tons on the top roll. This yard has a dry dock 600 feet long, 130 feet wide, in which the Paris and other vessels of the American Line have been docked. Another dock is in course of construction, which will be much larger than any other in this country.

The battleships Illinois, Missouri, Kearsarge, and Kentucky are now building at this yard, and a number of gunboats and merchant steamers have been built here. The plant is constantly in operation, requiring a force of 3,000 workmen.

Cruisers, gunboats and torpedo boats have been built at the Columbian Ironworks, Baltimore, Md.; Bath Iron Works, Bath, Me.; Roach's Yard, Chester, Pa.; City Point Works, Boston, Mass.; Crescent Shipyard, Elizabethport, N.J.; Harlan & Hollingsworth Co., Wilmington, Del.

Gunboats and torpedo boats have been built by:—Neafie & Levy, Philadelphia, Pa.; Herreschoff Mfg. Co., Bristol, R.I.; Hillman Ship and Engine Co., Philadelphia, Pa.; William R. Trigg Co., Richmond, Va.; Fore River Engine Co., Weymouth, Mass.; Gas Engine and Power Co., Morris Heights, N.J.; Maryland Steel Co., Sparrows Point, Baltimore, Md.; Wolff & Zwicker, Portland, Ore.; Moran Brothers Co., Seattle, Wash.; Lawley & Sons, South Boston.

Armour and ordnance material is made by Bethlehem Iron Co., Pa.; Carnegie Steel Co., Pittsburg; Otis Steel Works; Midvale Steel Co., Midvale, Pa.; Driggs-Seabury Gun & Ammunition Co., Derby, Conn.; American Ordnance Co., Bridgeport, Conn.; Winchester Repeating Arms Co.; Colts Fire Arms Manufacturing Co.; Union Metallic Cartridge Co.; Carpenter Steel Co.; and torpedo works of E. W. Bliss & Co., Brooklyn. Many other private machine shops and steel works furnish material by public bid for contracts.

It is the policy of the country to have everything that enters into the construction and outfit of ships of war produced in the United

States, whether at the navy yards or by contract with private firms. Some of the navy yards are fitted for the manufacture of certain articles—ropes, canvas gear, etc., being made chiefly at Boston, Mass.; electrical apparatus in New York; guns and ordnance material at the gun factory at Washington navy yard; torpedoes, mines and explosives at the torpedo station, Newport, R.I.

Material.

The accompanying list gives full particulars of all the vessels in the Navy and those which were taken from the merchant marine during the war with Spain and retained in the Navy. The latter include 7 of the 11 merchant vessels converted into cruisers, some of the converted yachts and tugs, and all of the colliers and special vessels; or about 60 out of the total of 123 auxiliary naval vessels that were employed during the war.

SUMMARY SHOWING THE NUMBER OF VESSELS IN THE UNITED STATES NAVY.

Regular Navy.

First-class Battleships	12
Second-class Battleship	1
Armoured Cruisers	2
Armoured Ram	1
Double-Turreted Monitors	6
Steel Single-Turret Monitors	4
Iron Single-Turret Monitors	13
Protected Cruisers	13
Protected Cruisers Sheathed with Wood	2
Unprotected Cruisers	3
Gunboats	9
Light-Draft Gunboats	3
Composite Gunboats	6
Training Ship (Naval Academy)	1
Special Class	2
Torpedo-boat Destroyers	16
Steel Torpedo-boats	35
Submarine Torpedo-boat	1
Wood Torpedo-boat	1
Captured in Spanish-American War	8
Iron Cruising Vessels	5
Wooden Cruising Vessels	8
Total Number of Vessels in Regular Navy	152

Auxiliary Navy.

Merchant Vessels converted into Auxiliary Cruisers	11
Converted Yachts	28
Converted Tugs	27
Steamers converted into Colliers	19
Special Class	17
Revenue Cutters	15
Lighthouse Tenders	4
United States Fish Commission	2
Total Number of Vessels in Auxiliary Navy	123
Grand Total	275

The distribution of ships in commission has been given in the previous chapter, but we may recapitulate it here. In the North Atlantic Squadron there are the battleships Indiana, Massachusetts and Texas, the armoured cruisers New York and Brooklyn, five second-class cruisers, three third-class cruisers, six sloops or gunboats, besides smaller craft. On the Pacific Station there are the battleship Iowa, one second-class cruiser, and four gunboats. On the Asiatic Station there are the battleship Oregon, four second-class cruisers, one third-class cruiser, two monitors, nine sloops or gunboats, and several special service vessels. In reserve there are three monitors, the first-class cruisers Columbia and Minneapolis, the ram Katahdin, and some less effective vessels. The monitor Amphitrite is on special service. Ships in commission.

The tabular statement below gives the condition of all vessels under construction July 1, 1898:—

NAME OF VESSEL.	WHERE AND BY WHOM BUILDING.	Estimates of Superintending Constructors.	
		Percentage of completion July 1.	Probable date of completion.
Kearsarge	Newport News Shipbuilding and Dry Dock Co., Newport News, Va.	61·42	August, 1899.
Kentucky	„ „ „	61·12	„ „
Illinois	„ „ „	48·74	April 1, 1900.
Alabama	Wm. Cramp & Sons, Philadelphia, Pa.	60·00	September 24, 1899.
Wisconsin	Union Iron Works, San Francisco, Cal.	40·00	September 1, 1899.
Albany	Sir Wm. G. Armstrong, Mitchell & Co., Newcastle-on-Tyne, England.		
Chesapeake	Bath Iron Works, Bath, Me.	3·00	June 16, 1899.
Rowan	Moran Bros. Co., Seattle, Wash.	99·00	Completed except official trial.
Dahlgren	Bath Iron Works, Bath, Me.	80·00	February 1, 1898.
T. A. M. Craven	„ „ „ „	60·00	March 1, 1898.
Farragut *b*	Union Iron Works, San Francisco, Cal.	88·00	August 6, 1898.
Davis	Wolff & Zwicker Iron Works, Portland, Oreg.	94·00	November 1, 1898.
Fox	„ „ „	88·00	December 1, 1898.
Mackenzie	The Chas. Hillman Ship and Engine Building Co., Philadelphia, Pa.	99·00	Completed except official trial.
Stringham	Harlan & Hollingsworth Co., Wilmington, Del.	35·00	January 29, 1899.
Goldsborough	Wolff & Zwicker Iron Works, Portland, Oreg.	15·00	In doubt.
Bailey	Gas-Engine and Power Co., Morris Heights, N.Y.	12·00	February 1, 1899.
Plunger	Columbian Iron Works, Baltimore, Md.	73·00	In doubt.
Penacook	United States Navy Yard, New York	20·00	December 1, 1898.
Pawtucket	United States Navy Yard, Mare Island, Cal.	18·00	„ „

b Delayed by accident on trial.

Under the provisions of the last Congress for "Increase of the Navy," designs were prepared for the construction of three seagoing coast-line battleships, four monitors, sixteen torpedo-boat destroyers, and twelve torpedo-boats, and bids for their construction invited by Vessels appropriated for.

the Department. Preliminary work upon the design of the gunboat for which appropriation was made to take the place of the U. S. S. Michigan has commenced.

Contracts awarded.

Contracts have been awarded for the construction of battleships, monitors, torpedo-boats, and destroyers in accordance with the table given below.

Name.	Contractor.	Contract Price.	Remarks.
Battleships.		$	
No. 10, Maine	Cramp & Sons	2,885,000	Contractor's plans.
No. 11, Missouri	Newport News Shipbuilding Co.	2,885,000	" "
No. 12, Ohio	Union Iron Works	2,899,000	" "
Monitors.			
No. 7, Arkansas	Newport News Shipbuilding Co.	860,000	Government plans.
No. 8, Connecticut	Bath Iron Works	862,000	" "
No. 9, Florida	Lewis Nixon	825,000	" "
No. 10 Wyoming	Union Iron Works	875,000	" "
Torpedo-Boat Destroyers.			
No. 1, Bainbridge	Neafie & Levy	283,000	Government plans.
No. 2, Barney	" "	283,000	" "
No. 3, Chauncey	" "	283,000	" "
No. 4, Dale	William R. Trigg Co.	260,000	" "
No. 5, Decatur	" " "	260,000	" "
No. 6, Hopkins	Harlan & Hollingsworth Co.	291,000	Contractor's plans.
No. 7, Hull	" " "	291,000	" "
No. 8, Lawrence	Fore River Engine Co.	281,000	" "
No. 9, Macdonough	" " "	281,000	" "
No. 10, Paul Jones	Union Iron Works	285,000	Government plans, slightly modified.
No. 11, Perry	" " "	285,000	" "
No. 12, Preble	" " "	285,000	" "
No. 13, Stewart	Gas-Engine and Power Co.	282,000	Government plans.
No. 14, Truxtun	Maryland Steel Co.	286,000	Contractor's plans.
No. 15, Whipple	" " "	286,000	" "
No. 16, Worden	" "	286,000	" "
Torpedo-Boats.			
No. 24, Bagley	Bath Iron Works	161,000	Contractor's plans.
No. 25, Barney	" " "	161,000	" "
No. 26, Biddle	" " "	161,000	" "
No. 27, Blakely	Lawley & Son	159,400	Government plans.
No. 28, De Long	" "	159,400	" "
No. 29, Nicholson	Lewis Nixon	165,000	" "
No. 30, O'Brien	" "	165,000	" "
No. 31, Shubrick	William R. Trigg Co.	129,750	" "
No. 32, Stockton	" " "	129,750	" "
No. 33, Thornton	" " "	129,750	" "
No. 34, Tingey	Columbia Iron Works	168,000	" "
No. 35, Wilkes	Gas-Engine and Power Co.	146,000	" "

Alabama type.

The three battleships Alabama, Illinois, and Wisconsin, authorised June 10, 1896, were launched on May 18, October 4, and November 26, 1898, respectively at Cramp's, Newport News, and Union Iron Works. These vessels, in the opinion of American constructors, represent an efficient type of battleship, and the new ships are practically to duplicate this type, but with a speed of 18 knots, 20 feet longer, and about 1,000 tons greater displacement. The new Krupp process armour admits a reduction of at least 25 per cent. in the thickness of the armour with the same resistance.

The Alabama type was described in the Annual of 1896, but a more complete description is deemed desirable to convey a clear idea of these new constructions. The dimensions are as follows:— Length on load water-line, 368 feet; beam extreme, 72 feet 2 ins.; draught on normal displacement of 11,525 tons, 23 feet 6 ins.; maximum displacement, all ammunition and stores on board, 12,325 tons; maximum indicated horse-power (estimated), 10,000; probable speed 16½ knots; normal coal supply, 800 tons; coal supply, loose storage, 1,200 tons; full bunker capacity, 1,400 to 1,500 tons; complement of officers, 40; seamen, marines, etc., 449.

The main battery consists of four 13-inch breech-loading rifles in Hichborn balanced turrets, oval in shape, and placed on the centre line of the vessel, and fourteen 6-in. R.F. guns. The secondary battery consists of sixteen 6-pdr., four 1-pdr. R.F. guns, two Colt guns and two field guns. There are four torpedo tubes. The 13-in. guns have an arc of fire of 135 degrees on each side of the centre line, and the 6-in. guns an arc of 90 degrees on the broadside, with the advantage to those on the upper deck of a direct fire ahead or astern. Any injury to or near either of these 6-in. guns will be confined to its own compartment, as a 1½-inch steel splinter bulkhead separates each of these guns from its neighbour.

The armour belt, which extends from the stem to abaft the after turret, is 16½ ins. thick at the top and 8½ ins. thick at the bottom except at the forward end, where it tapers to 4 ins. at the stem. This belt armour extends from 4 feet below the normal load line to 3½ feet above it, and maintains the full thickness amidships between the turrets and for the distance occupied by the engines and boilers. Diagonal armour 12 ins. thick, connecting this belt armour and barbettes, and extending from the slopes of the protective deck to the top of side belt on each side, is worked to give protection from a raking fire. Abaft the after turret the protection is completed by thickening the protective deck to 4 ins. on the slope with 2¾ ins. on the flat. The armour on the 13-in. gun turrets is 17 ins. on the front and 15 ins. on the rear and sides, while on the barbettes for these turrets, which are circular in shape, it is 15 ins. on the front and 10 ins. on the rear and sides. The sides of the vessel above the belt armour in way of the 16-in. battery, and forming a casemate, is armoured with 5½ ins. of steel, extending between the turrets, with diagonal armour of the same thickness at the ends, connecting with the barbettes and working above the 12-in. diagonal armour below. She will be protected against the entrance of water in case of injury to the side at the water line by cofferdams extending for the length of the vessel on each side, and having a general width of 3 feet, with a

total capacity of about 12,500 cubic feet for stowage of fire-proofed corn pith cellulose.

The height of freeboard of the vessel's hull proper is forward 20 feet, and at the stern 13¼ feet. The floor of the pilot house is 45 feet high, thus placing the eye of the steersman, for ordinary cruising, about 50 feet above the water. The sight-holes in the conning tower for use in close fighting are 34½ feet above the water. The core of the forward 13-in. guns has an elevation of 26½ feet, and the after 13-in. guns 19 feet above the surface of the water. The 6-in. guns vary from 15 to 22½ feet, and the 6-pdrs. from 30 to 40½ feet above the water. This great height above water of both main and secondary batteries, will enable the vessel to be fought in any weather, a quality always sought for, but obtainable only in vessels of good size, and considered of immense advantage by all naval authorities.

Maine class. In the new vessels to be laid down, the latest type of 12-in. gun, with smokeless powder and a muzzle velocity of 3000 feet per second will be substituted for the 13-in. guns in the Alabama type. They will have two submerged torpedo-tubes and carry eight 17-foot torpedoes. These will be the first under-water torpedo-tubes as yet introduced in the U.S. Navy.

Value of torpedo-tubes. The writer is of opinion that battleships should not carry any torpedoes, and that they could be advantageously dispensed with to allow for more coal or an increase in gun fire. Torpedo vessels should be the only ones to carry torpedoes. In the war with Spain torpedoes were much more dangerous to those who attempted to use them than to their enemy, and in torpedo target practice with the squadron at sea, even under favourable conditions, the unreliability of the delicate, complicated Whitehead torpedoes is apparent. In the excitement of battle, considering their limited range and all the conditions for their operation, many American naval officers believe that torpedoes cannot be used to advantage.

The Maine, Missouri, and Ohio are to be built on bidders' designs, which are based upon the general features of a Departmental design which they will practically imitate.

Dimensions and Particulars.

Hull.

Length on load water-line	388 ft.
Length over all	393 „ 9 in.
Breadth, moulded	72 „
Breadth, extreme	72 „ 2½ „
Freeboard, forward	20 „
Freeboard, aft	13 „ 3 „
Freeboard, amidship	20 „ 3½ „

Hull—continued.

Mean draft, with 1000 tons coal and all stores and ammunition	23 ft. 10¼ in.
Corresponding displacement	12,500 tons.
Mean draft, with all provisions, stores, ammunition, and 2000 tons of coal on board	25 ft. 6 in
Corresponding displacement	13,500 tons.
Speed per hour in knots	18
I.H.P., with assisted draft	16,000

Armament.

Main battery . . . . 4 12-in. B. L. R., 16 6-in. R. F.
Secondary battery . 20 6-pdr. R. F., 6 1-pdr. R. F., 4 Gatlings, 1 field gun.

Height axis forward 13-in. guns above 23 ft. 10¼ in. L.W.L.				26 ft. 1½ in.
Height axis after 13-in. guns	„	„	„	18 „ 7½ „
Mean height axis 6-in. guns main deck	„	„	„	15 „ 0 „
Mean height axis 6-in. guns upper deck	„	„	„	22 „ 4½ „

2 submerged torpedo-tubes.

Armour.

Water-line belt, thickness amidships:—

To 1 ft. below L.W.L.	12 in.
Bottom	8½ „
Height above load line	3 ft. 6 in.
Total depth of belt	7 „ 6 „
Side armour above main belt, thickness	7 in.
Superstructure armour, „	7 „
Turret armour (12-in. guns), „	12 and 11 in.
Roof of turret, „	3 in.
Barbette armour, „	12 and 9 in.
Protective deck armour, „	2¾ to 4 in.
Conning tower armour, „	10 in.

General Schedule of Weights.

Hull and fittings	4836 tons.
Armour and bolts	2933 „
Protective deck armour	600 „
Armament and ammunition	1058 „
Machinery, with water	1396 „
Equipment	199 „
Outfit and stores	478 „
Coal	1000 „
Total	12,500 „

Machinery.

Vertical, inverted cylinder, direct acting, triple expansion engines, in two water-tight compartments.

Collective I.H.P. of propelling, air-pump, and circulating pump engines	16,000
Number of revolutions at this power	126
Diameter of high-pressure cylinder	38½ in.
Diameter of intermediate cylinder	59 „
Diameter of low-pressure cylinder	92 „
Length of stroke	42 „
Cooling surface, main condenser	9600 sq. ft.
Cooling surface, auxiliary condenser	800 „

Boilers.

Will consist of 24 Niclausse water-tube type, arranged in three groups of 8 boilers each. Each group is subdivided by the centre line bulkhead. Each boiler will have fifteen elements of 24 tubes, the whole number of elements being 360 and the number of tubes 8640.

Total heating surface	58,104 sq. ft.
Total grate surface	1353 „

The boilers are designed to carry a working pressure of 250 pounds per square inch above the atmosphere.

Monitors. Arkansas and class.

In appropriating for four coast-defence monitors Congress did not contemplate providing vessels equal in size to the double-turreted monitors now in commission, the cost of hull and machinery being limited to $1,250,000. The bill provided that the vessels should have either one or two turrets. It was found advisable, however, owing to the limitations of cost and therefore of size, to develop the design on the basis of a single turret mounting a pair of 12-in. guns. Except for a slight change in model, the hull represents a reduced Monterey, displacing about 30 per cent. less under similar conditions. The scantlings, however, are the same in both vessels, insuring greater strength and longer life to the smaller. The contract trial speed is 11·5 kts., which can be exceeded by the Monterey only under the most favourable conditions, and the coal endurance is greater than in the case of that vessel. The armour protection is proportionately heavier than that of the Monterey, and somewhat differently distributed. In comparison with the older monitors, such as the Amphitrite and Monadnock, the present design, owing to saving of weight in hull and machinery, is superior in speed, in protection, and in every other particular excepting gun power, which is, considered as a whole, only slightly less than in the case of the vessels mentioned, which have four 10-in. guns mounted in two turrets, but a fewer number of guns of smaller calibre. The special features of the latest monitor design involve the use of water tube boilers entirely, the adoption of the most recent designs of balanced turret, the high power 12-in. guns referred to in connection with the battleship designs, and the extended application of electricity for turning gear, hoists, ventilating blowers, &c. In the general arrangements many improvements have been introduced which it is believed will add to the comfort of officers and crew and to the efficiency of the vessel. The stern has been rounded so as to fully protect the screws, increasing the deck room at the same time.

The state-rooms for all officers, including the captain, are located on the berth deck. The messroom for the wardroom officers is located in the after end of the superstructure. A day cabin for the commanding officer is also provided inside the superstructure.

The windlass has been placed in a raised enclosure, just forward of the turret, similar to the arrangement on the Indiana class of battle-ships. This will obviate the great difficulty which has been experienced in all the monitors, including the Monterey, due to the chain having to pass through the main deck to the windlass below, it having been found impossible to fit plugs or stoppers that would be always efficient in preventing water from penetrating to the berth deck. By the present arrangement the chain passes directly from the wildcats into watertight chain lockers.

Special arrangements are made for utilising a portion of the double bottoms for carrying a spare supply of fresh water, to the extent of about 50 tons, for boiler feed purposes. It is worthy of note that the design contemplates carrying on the normal mean draught of 12 ft. 6 ins. the full supply of 400 tons of coal, all stores and ammunition, and 10 tons of spare feed water.

The dimensions and particulars are as follows :—

Hull.

Length on load water-line	252 ft.
„ over all	255·1 ft.
Beam, moulded	49 ft. 10 in.
„ extreme	50 „
Freeboard, forward	2 „ 6¾ in.
„ aft	2 „ 6¾ „
„ amidship	2 „ 6¾ „
Mean draft (with 400 tons coal and all stores)	12 „ 6 „
Corresponding displacement	3000 tons.
Speed in knots per hour	11·5
I.H.P.	2400

Armament.

Main battery	2 12-in. B.L.R., 4 4-in. R.F.
Secondary battery	3 6-pr. R.F., 4 1-pr. R.F.
Height of axis of 12-in. guns above load water-line	10 ft. 1 in.
„ „ 4-in. „ „ „ „	14 „ 7 „

Armour.

Water-line belt the whole length of ship :—	
Thickness at the top	11 in.
„ „ bottom	5 „
Tapered at ends at top	5 „
„ „ bottom	3 „
Depth of belt	5 ft.
Thickness of turret armour	10 in.
„ barbette armour	11 „
„ conning-tower armour	7 „
„ protective deck armour	1½ „

The main propelling engines will be of the vertical, inverted cylinder, direct-acting, triple expansion type, and will be placed in one watertight compartment.

Collective I.H.P. of all machinery in engine-room	2400
Corresponding number of revolutions of main engines	200

There will be four water-tube boilers constructed for a working pressure of 250 lbs. per square inch. The total grate surface will be at least 200 sq. ft., and the total heating surface about 8800 sq. ft. The boilers will be in one compartment, with a fore and aft fire-room amidships. There will be one smoke-pipe for all the boilers.

Torpedo-boat destroyers. The designs for these vessels cannot be referred to any particular type. The midship section approximates to the oval form, largely adopted by the French. The sections toward the stern are original, though resembling somewhat the form given by Thornycroft to his twin rudder boats of some years ago. The relative arrangement of engines in separate compartments, between boilers, is similar to that on the torpedo-boats. The officers and petty officers are quartered aft and the crew forward, under a raised forecastle. Four officers and a crew of sixty are provided for, with stowage for twenty days' provisions. In addition to coal abreast the machinery, there will be the protection of 12½-lb. nickel-steel plates over a portion of the deck and on the sheer strake. The forward conning-tower is of ½-in. nickel-steel plates. The vessels carry a battery of two 12-pounder and five 6-pounder guns, with two long torpedo-tubes, mounted on the midship line. Two cutters, one whaleboat, and two folding boats are to be carried.

Certain builders presented their own plans, differing in various respects from the Department's designs. In practically all cases the forecastle deck was left off and the turtle-back construction substituted. In several instances the arrangements of officers' quarters and crew space were entirely altered. The form of the entrance and run was also altered in most cases to accord with the tastes of the designers. Speeds as high as 30 knots were guaranteed. Specifications were altered to meet the different designs, but, on the whole —the vessels being limited between 400 and 435 tons—the variations in designs were not material, and the bids accompanying them received due consideration. Seven vessels were awarded on bidders' plans, being on three different designs; the remaining nine vessels were divided among four firms. Slight modifications were made in the contracts for these, in several cases involving an increase of speed to 29 knots on slightly increased weight. The seven boats to be built on bidders' plans are to make speeds of 29 and 30 knots. No firm attempted to contract for completion in a less period than the twelve and eighteen months maximum allowed.

An important and somewhat novel feature of all the destroyers is the introduction of bilge keels, decided upon as the result of experiences at sea with even the largest of our torpedo-boats, which have been found to wear out the crews in a very few days, principally by

excessive and lively rolling. These are the boats that will be expected to keep the seas in the future, and the fitting of bilge keels was thought to be important. In both the torpedo-boats and destroyers the wood has been required to be fire-proofed and its use reduced to a minimum. The vessels will be lighted throughout by electricity and fitted with search-lights. Special attention will be paid to adequate ventilation, and every comfort and convenience consistent with the type will be supplied.

The following are the dimensions and particulars of the Department designs:— Department design.

Hull.

Length on load water-line (normal condition)	245 ft. 0 in.
Beam at load water-line	23 „ 0 „
Draft	6 „ 6 „
Corresponding displacement (in tons)	420
Speed per hour in knots	28
I. H. P.	8000
Mean draft, with all stores, provisions, ammunition, and 212·3 tons of coal on board	8 ft. 4 $\frac{1}{16}$ in.
Corresponding displacement in tons	630·9

Armament.

2 12-pdr. R. F. guns.
5 6-pdr. S. A. R. F. guns.
2 long Whitehead central pivot torpedo-tubes.

General Schedule of Weights.

	Full supply. Tons.	Normal supply (trial). Tons.
Hull and fittings	174·9	174·9
Ordnance weights	23·6	15·0
Equipment weights	7·4	5·0
Ship's outfit	23·6	11·0
Machinery, propelling, with water	189·1	189·1
Coal	212·3	25·0
Total	630·9	420·0

There will be four water-tube boilers constructed for a working pressure of 300 pounds per square inch. Two of these boilers will be placed in a watertight compartment forward of the engines and the others will be placed in a watertight compartment aft of the engines. The boilers in the after compartment and the after boiler in the forward compartment will be alike, each containing about 80½ square feet of grate surface. The forward boiler will not be as wide as the others and will contain about 73½ square feet of grate surface, the length of the grates not exceeding 7 feet in any of the boilers. The total grate surface will be at least 315 square feet and the total heating surface at least 17,768 square feet. There will be four smoke-pipes—one for each boiler.

Torpedo-boats.

The Department's plans of torpedo-boats were similar, in many respects, to those of the Winslow class, which were prepared in the Bureau of Construction and Repair a few years ago when the Cushing represented the full strength of our torpedo-boat fleet. The new boats are 15 feet longer and of from 20 to 25 tons greater displacement. The speed is of course greatly increased over the 24½ knots, which was considered about the highest practicable speed for small boats—in this country, at least—at the time the Winslow was designed. The form of stern differs considerably from that of the Winslow class; otherwise, the two models are rather similar.

The assignment of quarters for officers forward and for the crew aft, and the relative arrangement of boilers and engines in separate compartments, is entirely similar to that of the Winslow. The officers' quarters are a trifle less roomy, but those for the crew more so. More deck room has been provided by doing away with the round at the side which experience has shown to present more drawbacks than advantages. The position of the forward torpedo-tube has been changed, bringing it considerably farther aft. This is also the result of experience, following the abandoning of the fixed tube in the bow.

TORPEDO-BOATS.

Department Design.

Dimensions and Particulars.

Hull.

Length on load water-line (normal condition)	175 ft. 0 in.
Beam at load water-line " "	17 " 0 "
Draft " "	4 " 8 "
Corresponding displacement in tons	165
Speed per hour in knots	26
I.H.P.	3000
Mean draft (with all stores, provisions, ammunition, and 70 tons of coal on board)	5 ft 8¾ in.
Corresponding displacement in tons	230

Armament.

3 3-pdr. S.A.R.F. guns.
3 short Whitehead central pivot torpedo-tubes.

General Schedule of Weights.

	Full supply. Tons.	Normal supply (trial). Tons.
Hull and fittings	57·1	57·1
Ordnance weights	12·7	8·9
Equipment weights	3·2	3·2
Ship's outfit	7·2	6·4
Machinery, propelling, with water	79·8	79·8
Coal	70·0	10·0
Total	230·0	165·4

Machinery.

The propelling engines will be of the vertical, inverted cylinder, direct-acting, triple-expansion type, and will be placed in separate watertight compartments.

Collective I.H.P. of propelling machinery	3000
Number of revolutions for above I.H.P.	350

There will be three water-tube boilers constructed for a working pressure of 250 lbs. per square inch. Two of these boilers will be placed in a watertight compartment forward of the engines, and the other will be placed in a watertight compartment abaft the engines. The total grate-surface will be at least 137 square feet, and the total heating-surface at least 7544 square feet. There will be three smoke-pipes, one for each boiler.

Fireproof woodwork.

The war demonstrated the necessity of avoiding the use of combustible material in the construction of ships of war. In new vessels fireproofed wood will be introduced generally. The following is a list of vessels which now have fireproofed woodwork: Iowa, for all joiner work above protective deck; Brooklyn, for about half of joiner work above protective deck; Alabama, Illinois, Kearsarge, Kentucky and Wisconsin, all joiner work; Miantonomoh, Chicago, Wilmington, Helena, Nashville, Annapolis, Marietta, Newport, Princeton, Vicksburg and Wheeling, for decks and joiner work; Rowan, Winslow, Rodgers, Foote, Morris, Talbot, Gwin, Mackenzie and McKee, for joiner work.

Refits.

The Chicago and Atlanta have been undergoing extensive repairs and have been greatly improved. The work on the Atlanta is still in progress. The reconstructed Chicago is a much more efficient vessel. Her armament is now four 8-inch breech-loading rifles and fourteen 5-inch rapid fire guns for the main battery and seven 6-pounders, ten 3-pounders, six 1-pounders, two Colts, and one 3-inch field gun. She has six Babcock and Wilcox boilers and four single-ended cylindrical boilers. It is estimated that she will make a speed of 18 knots with 9000 horse-power.

Machinery and boilers.

The tactical importance of water-tube boilers is also being thoroughly recognised, and has been emphasised by the conditions which obtained in the blockade of Santiago and the great victory of July 3. It was necessary for a long period that the ships should be ready to develop maximum power at a few minutes' notice, and with cylindrical boilers this involved keeping all the boilers under steam, with heavily-banked fires and an attendant large consumption of coal. Water-tube boilers of the proper kind, which admit of the rapid raising of steam with safety, remove this difficulty and give the commanding officer a more complete control of his fighting machine.

One very striking advantage for war vessels is that the boilers can be replaced or practically rebuilt without disturbing the decks, all parts being small enough to pass through permanent openings.

This was the case in the Monterey, and it was strikingly illustrated this summer in the case of the Canonicus, Manhattan, and Mahopac, where it would have been impossible to use any but water-tube boilers without practically rebuilding portions of the hull.

All torpedo boats have water-tube boilers, and four large vessels, including the Monterey, are so fitted. The Chicago and Atlanta, also have boilers of this type now installed. The three new battleships and the four new monitors will have water-tube boilers, and the sixteen destroyers have them as a matter of course.

In water-tube boilers with straight tubes there has been thus far an unfortunate lack of economy under forced draft, but this will be avoided in the boilers for the new ships by using heaters for the air, which absorb the heat from the gases of combustion before they reach the smoke-pipe and thus enable a good economy to be secured.

There is not yet any agreement as to the particular make of water-tube boilers which is best from every point of view. Nearly every one has some feature of excellence.*

Experiments have been made with liquid fuel in the torpedo boat Stiletto, which were discontinued on account of the war, and which will be resumed.

Naval Ordnance.

In Naval Ordnance there has been a marked improvement in all details.

In the Oregon, Newark, and Yorktown new 6-in. rapid fire guns 40 calibres long have been substituted for the 6-inch breech-loading rifles formerly carried. Batteries of other ships will likewise be changed.

The Bureau of Ordnance is at present engaged in converting the 6-in. and 8-in. breech-loading rifles into rapid fire guns of 40 calibres. High power 50 calibre 4-in. guns are being made. Improved mounts are also being constructed. Electric power is to be used for turning turrets, hoisting ammunition, and operating gun-working machinery.

Hereafter, all vessels will be supplied with smokeless powder exclusively, except a few charges of brown powder for target practice, until the supply on hand shall have been consumed.

All guns of 4 ins. in calibre and over are fitted with attachments for using either electric or percussion primer firing apparatus, as well as with telescopic sights and a spare bar sight for use in case of accident to the telescope.

A new semi-automatic 6-pdr. R.F. gun will soon be issued for service by the Driggs-Seabury Company, a considerable number

* The facts about boilers are taken from the report of the Engineer-in-chief of the U.S. Navy.

having been contracted for by the Navy. This piece is intended to combine all the best features of similar guns now in use. The number of parts of the breech action has been much reduced. In fact, there are but six parts, including double extractors. There are no screws used in the mechanism, and but one spring. The operation of the piece is similar to that of other semi-automatic guns. The return to battery after firing opens the breech block, ejects the empty case, and leaves the gun ready for loading. As the new cartridge is entered, the breech closes and the firing mechanism is cocked. If now the trigger is held back, the charge will be fired as soon as the breech block is in place and locked. The gun then recoils and returns to battery, and the operation is repeated. If it is not desired to use the automatic feature of firing, the trigger is allowed to retain its normal position, and the gun can then be fired at will. This gun represents a considerable advance in rapid fire guns of light calibre, inasmuch as it gives the advantages of the semi-automatic feature of other guns, with a decrease in the number of parts.

Secretary of Navy's report.

The Secretary of the Navy in his annual report recommends the following: the *Personnel* Bill, of which the *Annual* has published full details; a regular Naval Reserve; some minor legislation; the revival of the grades of Admiral and Vice-Admiral to reward officers who rendered distinguished service during the war; the construction of two transports, one each for the Atlantic and Pacific coasts; that in view of the experience of the army with transports in the late war all transport service should be under the control of the Navy Department, and that it is necessary to follow the universal practice in other countries, of placing the work in the hands of naval officers, who are accustomed to handling and caring for large bodies of men on board ship; that Congress give authority to increase the enlisted force whenever necessary to 20,000 men, and to enlist apprentices to the number of 2,500; that the Navy should be increased; that the development of its various branches should be homogeneous, and that the increase in ships should be accompanied by a gradual increase in officers and men, and in naval stations, coaling stations, repair plants, &c.

New programme.

The Naval Board on Construction recommends the following increase:—

1. Three seagoing sheathed and coppered battleships of about 13,500 tons trial displacement, carrying the heaviest armour and most powerful ordnance for vessels of their class, and to have the highest practicable speed and great radius of action. Estimated cost, exclusive of armour and armament, $3,600,000 (£739,751) each.

2. Three sheathed and coppered armoured cruisers of about 12,000 tons trial displacement, carrying the heaviest armour and most powerful ordnance for vessels of their class, and to have the highest practicable speed and great radius of action. Estimated cost, exclusive of armour and armament, $4,000,000 (£821,989) each.

3. Three sheathed and coppered protected cruisers of about 6000 tons trial displacement; to have the highest practicable speed and great radius of action, and to carry the most powerful ordnance suitable for vessels of their class. Estimated cost, exclusive of armour and armament, $2,150,000 (£441,796) each.

4. Six sheathed and coppered cruisers of about 2500 tons trial displacement; to have the highest speed compatible with good cruising qualities, great radius of action, and to carry the most powerful ordnance suited to vessels of their class. Estimated cost, exclusive of armament, $1,141,800 (£234,624) each.

W. H. BEEHLER,

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CHAPTER V.

Naval Aspects of the Spanish-American War.

The outbreak of every war creates anticipations that vexed points will be settled, that fresh lessons will be forthcoming, and that the teaching of the past will prove to be modified or even obliterated by modern conditions. In times of peace our minds are naturally concentrated upon material. The details of each new warship, the alternating triumphs of guns and armour, and the numberless achievements of science directly or indirectly applicable to the business of war, are widely noted. Failing practical experience, we are driven to more or less intelligent theorising, and we formulate, each to his own satisfaction, ideas as to the relative potency and the most effective employment of ships and their weapons. When war comes, therefore, we inevitably seek for evidence in confirmation of our theories and for arguments with which to confute our opponents. The course of all wars is, however, ruled more or less inexorably by circumstances which may exclude the crucial tests which we need. The lessons are general rather than particular. Principles assert themselves; matters of detail are apt to sink into the background, and we experience a sense of disappointment. Yet there are few wars which do not repay study, and none from which we cannot learn something.

The inequality of national resources which characterised the four months' contest between the United States and Spain, and the foregone certainty of the issue, do not deprive it either of interest or of instruction. If some of the lessons are venerable, their reaffirmation, under changed conditions, is a distinct advantage.

Causes of war.

Insurrection in Cuba, which began on a small scale in 1823, reappeared at intervals, and at length passed entirely beyond the control of Spain. The spectacle of chronic disorder, varied only by periods of bloodshed and wholesale destruction of property, occurring in a rich island within ninety miles of their territory, could not be observed with equanimity by the American people. Directly and indirectly the interests of American citizens suffered, and a strong feeling of resentment gradually asserted itself. The United States Government, however, took no step of importance until November 1896, when it was plainly intimated in President Cleveland's annual Message that,

unless order in Cuba was speedily restored, "a situation will be presented in which our obligations to the sovereignty of Spain will be superseded by higher obligations which we can hardly hesitate to recognise and discharge." This clear warning was met by a declaration from Señor Canovas that "No concession of any kind will be made until the insurrection in Cuba is put under control." It was, at the same time, asserted that "Spain is strong enough to carry on the campaign in Cuba . . . no matter how long the struggle may last." The methods of General Weyler naturally excited great indignation in America, and, no improvement in the situation being visible, General Woodford was sent to Madrid in June 1897, with instructions to ask for an early date for the conclusion of hostilities.

The Maine.

Henceforth the maintenance of peace practically required either that the United States should relapse into indifference, or that Spain should make concessions repugnant to the national character, or successfully deal with the Cuban insurrection. Not one of these conditions was fulfilled. On January 24, 1898, the cruiser Maine was ordered to Havana, this being "the first visit of a vessel of the United States Navy to any port in Cuba for several years."* On the night of February 15, the Maine was destroyed at her anchorage with a loss of 266 lives, and popular feeling throughout the United States rose to fever heat. The American Board of Enquiry into the causes of the disaster reported on March 21 that "the Maine had been destroyed by the explosion of a submarine mine, but that it was unable to fix the responsibility upon any person or persons."† Already, on March 9, an emergency Bill appropriating £4,000,000 for national defence had been passed by Congress, and now, as after the action of Sinope in November 1853, the hand of diplomacy was forced by the Press and the people. On April 21, Congress formally declared war. The proximate causes, like those which led to the Crimean campaign, may be invested with varying relative importance according to the bias of individuals; but the philosophical historian of the future will probably come to the conclusion that a great and powerful nation cannot indefinitely acquiesce in disorders and barbarism immediately beyond its frontiers, and that the immense development of intercommunication which marked the nineteenth century had virtually rendered the island of Cuba contiguous to the United States.

Conditions of the war in the West.

The declared object of the war committed the United States to the restoration of order in Cuba, and thus introduced special conditions which ruled the course of events. The home territories of the

* Report of the Secretary of the Navy. 1898.
† *Ibid.*

belligerents were separated by more than 3000 miles of sea. Neither could invade the other, and the necessity for striking at a primary objective did not arise. By the capture of Havana, the centre of Spanish power in Cuba, the direct object of the United States would be attained; by the successful defence of Cuba, Spain would fulfil her immediate requirements. "The Caribbean is pre-eminently the domain of sea power," * and since the United States, unless prevented by naval means, would with certainty be able to accomplish the capture of Havana after more or less delay, the result of the contest evidently depended upon naval operations. On the other hand, Spain was committed to the defence of Cuba, which, as in all such cases, was possible only if maritime communication with the mother country could be maintained. Writing in June, 1897, Captain Mahan referred to "The pre-eminent intrinsic advantages of Cuba or rather of Spain in Cuba"; but these advantages could be turned to account only if naval supremacy in West Indian waters could be asserted. Assuming the latter condition, Puertorico, with the fortified port of San Juan, 1000 miles from Havana and 3300 miles from Cadiz, was also a strategic point of importance. Failing this condition, both Cuba and Puertorico were necessarily sources of weakness, and their fall was merely a question of time depending upon their power of military resistance on shore. For the above reasons, the war resolved itself primarily into a contest for the mastery of the Caribbean Sea. The United States were impelled to undertake the blockade of Cuba, which Spain must endeavour to prevent, and these conditions conferred a great initial advantage upon the former, whose centres of sea power lay much nearer to the scene of naval action than those of their antagonist.

In the East.

Unfortunately for Spain, insurrection was simultaneously and for like reasons rampant in her Far Eastern Colonies, where Manila, the centre of her power, was threatened by a serious native rising. Here also the situation was ruled by the naval conditions. If Spain could hold her own in the China Sea, it would be possible, so far as her home resources permitted, to strengthen the position in the Philippines. If her fleet in these waters were defeated or neutralised, there was nothing to prevent military intervention on the part of the United States. In the fortified bay of Manila, however, Spain possessed a good potential naval base, while the nearest naval centre of the United States squadron lay 7000 miles away across the Pacific.

The fleets.

In nominal strength the fleets of the belligerents were approximately equal. Neither could claim on paper the marked material

* Captain Mahan, June 1897.

superiority from which decisive results might be expected. The number of warships built or completing was:—

Nature.	United States.	Spain.
Battleships	5	1
Armoured cruisers . . .	2	7
Armoured coast defence vessels .	6	0
Armoured ram	1	0
Cruisers, protected . . .	21	5
„ unprotected . . .	8	10

The armoured sea-going vessels were as follows:—

United States.

—	Name.	Tons.	Nominal Speed.	Date of Launch.	Armaments.
Battleships	Iowa	11,410	17·0	1896	4 12-in. B.L.; 8 8-in. B.L.; 6 4-in. Q.F.; 20 6-pr. Q.F.
	Indiana .. . / Oregon .. . / Massachusetts .	10,288	16·0	1893	4 13-in. B.L.; 8 8-in. B.L.; 4 6-in. B.L.; 20 6-pr. Q.F.
	Texas (2nd Class)	6,315	17·8	1892	2 12-in. B.L.; 6 6-in. B.L.; 12 6-pr. Q.F.
Armoured Cruisers	New York ..	8,200	21·0	1891	6 8-in. B.L.; 12 4-in. Q.F.; 8 6-pr. Q.F.
	Brooklyn	9,215	21·9	1895	8 8-in. B L.; 12 5-in. Q.F.; 12 6-pr. Q.F.

Spain.

—	Name.	Tons.	Nominal Speed.	Date of Launch.	Armaments.
Battleship	Pelayo	9900	16·0	1887 / 1897	2 12·5-in., 2 11-in., 9 5·5-in. Q.F.; 6 small.
Armoured Cruisers.	Carlos V... ..	9235	20·0	1895	2 11-in. (Hontoria), 8 5·5-in. Q.F.; 4 3·9 in. Q.F.; 2 2·7-in.
	Cristobal Colon ..	6840	20·0	1896	10 6-in. Q.F.; 6 4·7-in. Q.F.
	Viscaya	7000	20·0	1891	2 11-in., 10 5·5-in. Q.F.
	Oquendo	7000	20·0	1891	
	Maria Teresa ..	7000	20·2	1890	
	Cisneros	7000	20·0	1896	
	Princesa de Asturias	7000	20·0	1896	

Note.—The Vitoria and Numancia are excluded as being little more than harbour defence ships.

The apparent superiority of the United States thus lay in their modern battleships and protected cruisers; while Spain disposed—

on paper—of a powerful force of modern armoured cruisers, seemingly well adapted for her immediate requirements. Both Powers had a considerable number of steamers registered as auxiliary cruisers.

The enlisted force of the United States numbered 12,500 men, making up a total trained *personnel* of about 16,000. The only available reserve was composed of the naval militias of the several States, which were armed and equipped, and had received a small amount of training intended to fit them for the defence of the coast-line and harbours. Spain, with a short service system, claimed to to have about 23,000 officers and men in actual service, with about 25,000 trained reservists. *Personnel.*

In financial and all other resources the superiority of the United States was overwhelming, while the populations numbered 75 and 17 millions respectively. The standing army of the United States, however, numbered only 27,500 men, scattered over a vast territory, while Spain had more than 100,000 men in Cuba alone, and the States Militia was indifferently trained and wholly unorganised. The state of the military preparations, having regard to the operations certain to be required, was even more defective than that in which Great Britain lightly entered upon the Crimean War. General resources.

Before the end of 1897, it was generally recognised that war was highly probable, and various steps were taken by the United States in the first quarter of 1898. Early in January, the Raleigh was sent from the Levant to reinforce the Eastern Squadron. On January 11, orders were sent to the commander-in-chief of the European station to retain men whose periods of enlistment were about to expire. The Commander-in-Chief in the South Atlantic was ordered to proceed with the Cincinnati, second-class cruiser, and the Castine, gunboat, to Para. The North Atlantic Squadron, consisting of the New York (flag), Iowa, Indiana, Texas, Massachusetts, Brooklyn, Maine, Terror, Marblehead, Montgomery, Nashville, Detroit, Fern, and Vesuvius, was ordered into the Gulf of Florida. After the destruction of the Maine this squadron proceeded to Key West. The New Orleans (Amazonas) and the Albany (Almirante Abru*) were assigned to the European Squadron, which was directed to proceed to the United States. The Olympia, under orders to return from the China Sea to San Francisco, was retained on her station, and on February 25 the whole Asiatic Squadron was ordered to assemble at Hong Kong, and to "keep full of coal"; the Oregon, then at Bremerton, Washington, was ordered to San Francisco "to prepare for a long voyage." Excess enlistment was sanctioned to make up the complements of the Preliminary measures, United States.

* Purchased in England from the Brazilian Government. The Albany was not launched till January, 1899.

Columbia, Minneapolis, Miantonomoh, and other vessels. The North Atlantic Squadron was largely reinforced, and concentrated in the neighbourhood of Key West. A flying squadron, under Commodore Schley, was organised, consisting of the Massachusetts, Texas, and Brooklyn, and stationed at Hampton Roads. Beginning on March 19, six days after the passage of the Defence Bill through Congress, the purchase of vessels continued till August 12, by which date 102 craft of the most varied natures had passed into the hands of the Government.* Four great steamers—St. Paul, St. Louis, Harvard (New York), Yale (Paris)—were chartered from the International Navigation Company, and the City of Peking from the Pacific Mail Steamship Company. Philadelphia lent the Arctic, ice-boat, and private yachts were offered for the period of the war. Other measures of many kinds were actively pressed forward, and the Secretary of the Navy has reported † that "The squadrons, ships, officers, and crews were in admirable condition and training, had been for months engaged in tactical manœuvres and gunnery practice, and were strengthened by the addition of the auxiliary vessels as rapidly as converted. The bureaus of the department had, by wise forethought, prepared them with every facility in the way of men, supplies, ammunition, information, and drills; and as early as April 15, four weeks before Admiral Cervera's fleet reached Cuban waters, the Navy of the United States was ready for the outbreak of hostilities." ‡ In naval preparations, the United States had, in fact, anticipated their opponents to an extent little recognised at the time. Inherited aptitude for naval war, supplemented by immense national resources, was turned to full account, and the main deficiency—trained reserves—was in part neutralised by the high standard of intelligence of the new levies. The retired list provided 225 officers, and 856 volunteers received temporary commissions, including 456 in the military branch, 64 surgeons and 185 engineers. The several States gave facilities to their militias to serve with the active force, and 4000 men were thus obtained. On August 15, the enlisted force reached its maximum of 24,123 men. "This great increase was made necessary by the addition of 128 ships to the Navy." ‡ The large expansion of the naval force of the United States is an extremely significant fact, as showing what can be accomplished in a short time by a vigorous nation possessing abundant national resources. Such improvisation can provide no adequate substitute for warships or a trained *personnel*; but it will always be necessary in naval war. Now, as formerly, merchant

* The prices varied from £285,000, paid for the Amazonas, to £3,800, paid for the Alice.

† November 15, 1898.

‡ Report of the Secretary of the Navy.

shipping and men previously untrained for fighting must be called upon to bear a part in national contests, while greater adaptability and a higher general standard of intelligence tends to enhance the value of extemporised crews. Natural aptitude for the conduct of maritime operations will confer undiminished advantages, and such aptitude was shown in a marked degree by the United States, although the strain imposed upon their navy was not severe.

Preparations in Spain.

In Spain, some efforts of preparation were made, but want of money, of resources, and of administrative capacity proved fatal. At the beginning of 1898, there was not a single completely effective warship, and in home waters there was no organised squadron. The isolated force in the Far East, composed mainly of obsolete craft, of which the flagship was scarcely the equal of our Active, was not, in the modern sense, a real fighting body. The efficiency of a navy, involving the fulfilment of exceedingly complex conditions, is a delicate test of sound government and of national vigour. Spain, throughout her history, in spite of great natural advantages, has never proved able to create and maintain a really efficient fleet.

Admiral Cervera's views.

The remarkable letters of Admiral Cervera, written in the three months preceding the outbreak of war, reveal the hopeless deficiencies of the Spanish navy. The national industries were paralytic.

Only the Vizcaya, Oquendo and Maria Teresa are good ships of their class; but, though constructed at Bilboa, it was by Englishmen .... As for the administration and its intricacies, let us not speak of that; its slow procedure is killing us.*

We must discount the Alfonso XIII., so many years under trials that it appears we shall not have the pleasure now to count her among our vessels of war. The fleet is reduced to the three Bilbao cruisers, the Colon, the Destructor, and the torpedo destroyers. The three Bilbao battleships are practically complete, but the 14-cm. artillery, the main power of these vessels, is practically useless, on account of the bad system of its breech mechanism and the bad quality of the cartridge cases, of which there are only those on board. The Colon, which is undoubtedly the best of all our ships from a military point of view, has not received her guns.† .... The Furor and Terror are in good condition, but I doubt if they can make effective use of their 75-mm. guns. As for the supplies required by a fleet, we frequently lack even the most necessary. In this Arsenal (Cadiz), we have not been able to coal, and both at Barcelona and Cadiz we could only obtain half the biscuit we wanted . . . We have no charts of the American seas, although I suppose that they have been ordered; but at the present time we could not move .... The eight principal vessels of the Havana station have no military value whatever, and besides, are badly worn out, therefore they can be of very little use.... Taking things as they are, however sad it may be, it is seen that our naval force, when compared with that of the United States, is approximately in the proportion of 1 to 3 .... It is frightful to think of the results of a naval battle, even if it should be a successful one for us, for how and where could we repair our damages? ‡

In a later letter of February 25, Admiral Cervera entered into detailed numerical comparisons, which were fully substantiated by events, and added with sound judgment:—

To carry out any serious operations in a maritime war, the first thing necessary is to secure control of the sea, which can only be done by defeating them, or rendering them

* January, 1898.
† The main armament of the Colon was never put on board.
‡ February, 1898.

powerless by blockading them in their military ports. Can we do this with the United States? . . . . The lack of industries and stores on our part render it impossible to carry on an offensive campaign . . . . If the control of the sea remains in the hands of our adversaries, they will immediately make themselves masters of any unfortified port which they may want in the island of Cuba, counting, as they do, on the insurgents, and will use it as a base for their operations against us.

On March 26, the Admiral wrote that the Vitoria could not be counted upon "for the present conflict," and that the Pelayo, Carlos V. and Numancia also were not ready. Alluding to the American forces in the East, he stated :—

"I have always considered these forces a great danger to the Philippines, which have not even a shadow of resistance to oppose to them."

Utter unpreparedness, in every phase, stands revealed in these letters, which, moreover prove, that while the gallant writer exactly gauged the situation and foresaw the event, he and his officers went willingly to the sacrifice prepared for them by an incompetent government. The information now available may not have been wholly at the disposal of the Washington authorities, and although some of the naval officers of the United States had formed a just estimate of the condition of the Spanish fleet, there was, in other quarters, a tendency to regard the naval conditions as approximately equal. "Our total force for the order of battle, prior to the arrival of the Oregon," writes Captain Mahan, "was nominally only equal to that of the enemy." *

Initial dispositions. Spain.

Shortly before the outbreak of war, the Spanish Government seems to have resolved to send the only available ships to the West Indies, and the Colon, Vizcaya, Oquendo, and Maria Teresa, with the destroyers, Terror, Furor, and Pluton, and the first-class torpedo-boats, Azor, Ariete, and Rayo, convoyed by the merchant steamer Cadiz, were despatched to St. Vincent, Cape Verde Islands. At a council of war held on board the Colon on April 21, it was unanimously agreed by the officers present, to call the attention of the government to the state of the squadron, and to urge a movement to the Canaries, which would thus be "protected against a rapid descent of the enemy, and all the forces would be in a position, if necessary, to come promptly to the defence of the mother country." † The bottom of the Vizcaya was so foul that she could "no longer steam;" the bow plates of the Furor and Terror had proved weak in a sea way, and "some of their frames have been broken." The boilers of the Ariete were "in bad condition, those of the Azor, very old." The Colon was without her heavy armament; the defective guns of the Vizcaya and Oquendo had not been replaced; there were

* The *Times*, December 1, 1898.
† Admiral Cervera.

only about 300 effective rounds of 14-cm. ammunition. On April 22, the day after the declaration of war, Captain Villaamil, commanding the destroyer flotilla, telegraphed from St. Vincent to Señor Sagasta:—

> I deem it expedient that you should know, through a friend who does not fear censure, that, while as seamen we are all ready to die with honour in the fulfilment of duty, I think it undoubted that the sacrifice of these naval forces will be as certain as it will be fruitless and useless for the termination of the war, if the representations repeatedly made by the admiral to the Minister of Marine, are not taken into consideration.

On April 24, Admiral Cervera wrote:—

> I have just received the telegram ordering us to start, and I have given orders to tranship from the Cadiz to these vessels, coal, supplies, crews, and the artillery of the destroyers, which was on board the Cadiz. I intended to sail without finishing the provisioning of the vessels, but since the Cadiz is to stay, I have decided to ship as much coal as possible. I will try to sail to-morrow...With an easy conscience, I go to the sacrifice; but I cannot understand the decision of the navy general officers against my opinions.

Such was the squadron which sailed westwards on April 29, leaving the torpedo-boats to return to the Canaries. It must be assumed that the Spanish government, in the peculiar circumstances, felt bound to make an apparent effort to succour Cuba, in face of the strong opinion of Admiral Cervera and his officers, that disaster was inevitable. The movement across the Atlantic must be regarded as political rather than naval (Pl. I.).

Initial dispositions. United States.

It is said that a fencer, ignorant of the elements of the art, may succeed in disconcerting an expert by the sheer irregularity of his proceedings. Something of this nature seems to have occurred in the case of the United States. While the more instructed Spanish naval officers expected the appearance of American ships in European waters, widespread fears of a formidable descent upon the Atlantic seaboard appear to have taken hold of the United States. Great efforts had been made for the defence of the important harbours. Additional guns had been mounted, and large numbers of mines installed, amply sufficient to exclude Spanish cruisers, if there had been any capable of making the attempt to enter. Public opinion, however, was not thus satisfied. There remained many undefended coast towns where valuable property was supposed to be in imminent danger of destruction from bombardment, and a popular outcry arose which Captain Mahan has stigmatised as "unworthy of men, unmeasured, irreflective, and therefore irrational." * His defence of the preliminary naval measures,† goes far to justify the outcry which he so unspar-

* The *Times*, December 1, 1898.
† The *Times*, December 26, 1898.

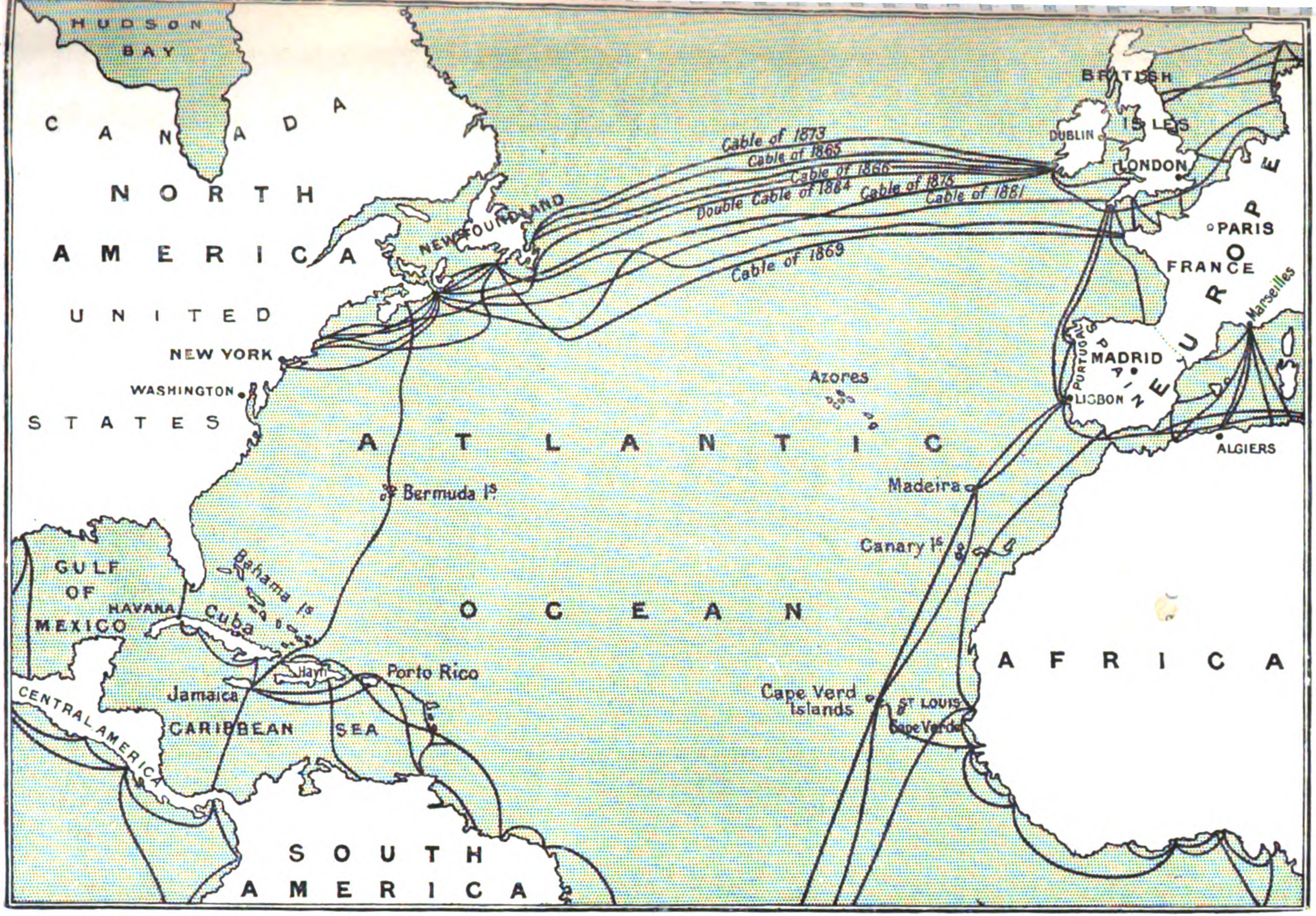
ingly condemns, and shows that the proceedings taken were strongly influenced by the theory that the Atlantic sea-board was in imminent danger.* Briefly, it was decided that "the four newer monitors... were not adequate singly to resist the attack which was suggested by the possibilities of the case." The Puritan, Amphitrite, Miantonomoh and Terror, were, therefore, assigned to Key West. The modern battle fleet was divided, and "the defence of the Atlantic coast for the time being" was entrusted to the "flying squadron" stationed in Hampton Roads, and consisting of the Massachusetts, Texas, Brooklyn (flag), Minneapolis and Columbia, under Commodore Schley. At or near Key West was the North Atlantic Squadron, under Captain (afterwards Rear-Admiral) Sampson,† consisting of the Iowa, Indiana, New York (flag) with the protected cruiser Cincinnati, the unprotected cruisers Detroit, Marblehead, and Montgomery, the gunboats Nashville, Helena, Castine, Wilmington, Newport, and Machias, the monitors, and the torpedo-boats, Porter, Dupont, Foote, and Winslow. This force was soon increased by the addition of yachts, light-house tenders, tugs, and various vessels armed with 6-pr. and 3-pr. Q.-F. guns and 1-pr. Maxim-Nordenfelts, and in a few cases with 5-in. and 4-in. guns. On April 20, the "Northern Patrol Squadron," which consisted of the protected cruisers San Francisco (flag), with the Prairie, Dixie, Yankee and Yosemite, and to which the Columbia, Minneapolis and Badger, were at various times attached, was placed under the command of Commodore Howell. Under the terms of a joint resolution of Congress approved on May 26, an "Auxiliary Naval Force" was organised for coast defence purposes and manned by the naval militia. The old monitors were commissioned, together with the purchased yachts, five purchased tugs, and other craft. "At the time of its maximum strength," this extemporised flotilla "included forty-one vessels, distributed over the Atlantic Gulf and Pacific coasts."

Situation on outbreak of war. Atlantic.

In the Atlantic, therefore, at the moment of the declaration of war the powerful belligerent was practically found in an attitude of passive expectancy, while the weak opponent was preparing for an offensive movement into distant waters. The apparent anomaly in either case can be attributed only to political causes. Captain Mahan has sought to justify the American dispositions on strategic grounds, by assuming that Cervera's squadron might be "recalled to Spain," and reinforced by the so-called battleship Pelayo and the armoured cruiser Carlos V. for a serious attack on the United States

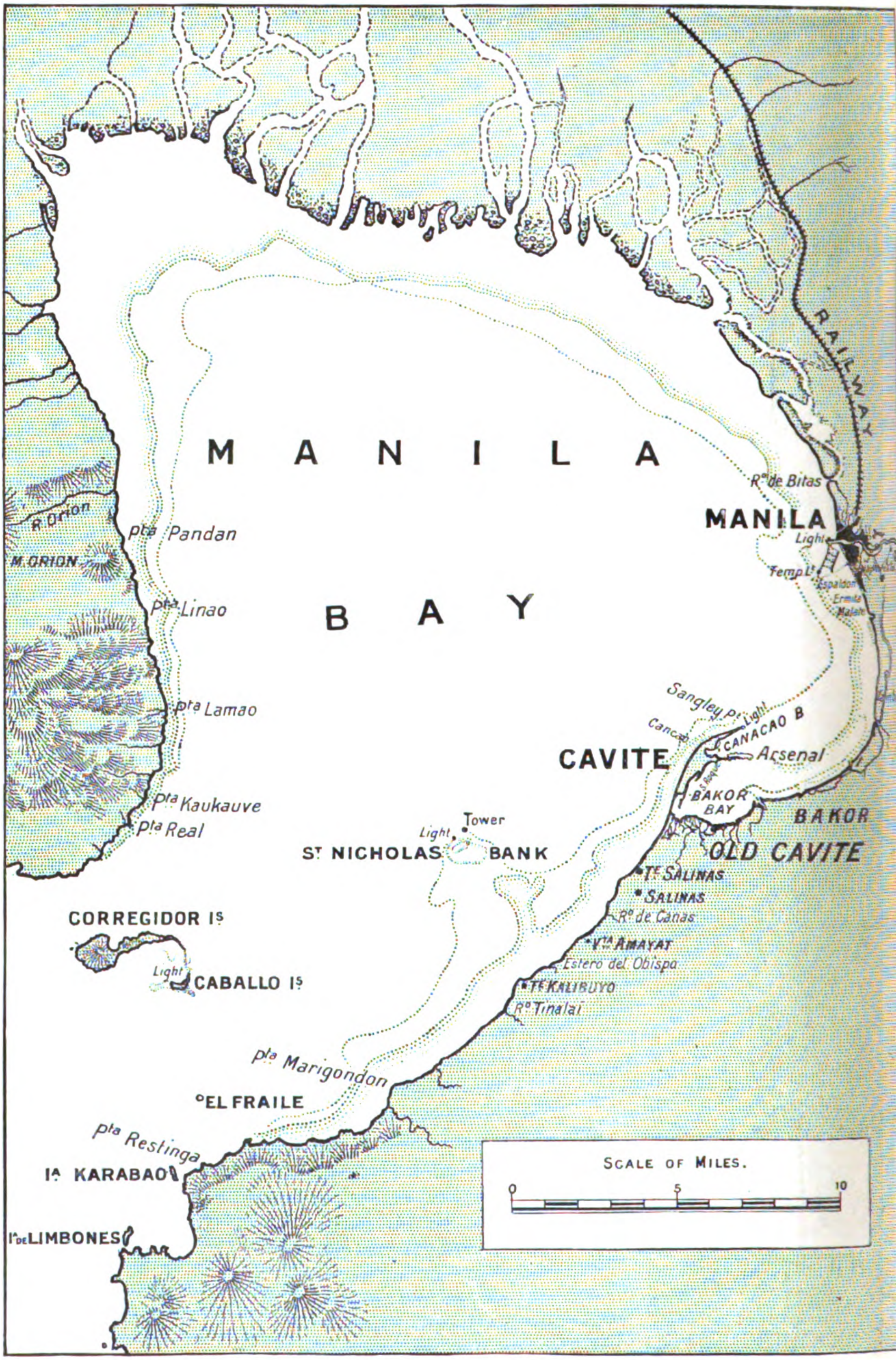
* Judging from the report of the Secretary of the Navy, similar fears were felt even on the Pacific Coast.

† Appointed on March 26, 1898, to succeed Rear-Admiral Sicard, whose health had broken down.



ATLANTIC OCEAN.

SHOWING CABLES.


MANILA BAY
RAILWAY
Rº de Bitas
MANILA
Light
Templ.
R. Orion
M. ORION
Pta Pandan
Pta Linao
Pta Lamao
Pta Kaukauve
Pta Real
Sangley Pt
Light
Cancab
CANACAO B
Arsenal
CAVITE
BAKOR BAY
BAKOR
OLD CAVITE
Tower
Light
ST NICHOLAS BANK
Te SALINAS
SALINAS
Rº de Cañas
Vta AMAYAT
Estero del Obispo
Te KALIBUYO
Rº Tinalai
CORREGIDOR Is
Light
CABALLO Is
Pta Marigondon
EL FRAILE
Pta Restinga
Ia KARABAO
Is DE LIMBONES
SCALE OF MILES.
0
5
10

MANILA BAY.

littoral.* Neither vessel was ready for sea till a later period, and in any case it is difficult to understand how the combined force could have covered the 3200 miles between Cadiz and New York and provided itself with coal for a sustained effort against the latter, for a severe naval action and for a possible return voyage. Captain Mahan, however, considers "that the power of a steam navy to move is practically unfettered," †—a view which seems to need much qualification.

The Far East.

In the Far East, Commodore Dewey, with the protected cruisers Olympia (flag), Baltimore, Boston and Raleigh, the Concord and Petrel gunboats, the McCulloch and two colliers, was at Hong Kong within 600 miles of the insignificant and unprepared Spanish squadron based on Manila.

Movements on outbreak of war.

The objects of the war declared by Congress on April 21, demanded primarily the capture of Havana which was defended by about 100,000 Spaniards in a strong position. For this purpose, a large and well equipped military force was required, which remained to be created, while the season, until the autumn, would be exceedingly unfavourable to land operations in Cuba. If, however, the expedition had been ready and the season propitious, it would have been contrary to sound strategy to invade Cuba until the menace of the Spanish fleet was removed. Popular clamour, which in such matters is almost invariably wrong, demanded immediate military operations, and it seems to have been intended to despatch 5000 regular troops from Tampa on May 4 to occupy a Cuban port and open up communications with the insurgents. The news of the sailing of Admiral Cervera sufficed to put an end to this project.

There was evidently a strong probability that the Cape Verde squadron would make first for San Juan Puertorico, 2400 miles distant, before proceeding to a Cuban port in order to fill its bunkers from the coal known to be there available. It thus appeared desirable to send the most powerful of the ships assembled at Key West to the eastward to await the declaration of war, and possibly to attempt a sudden *coup de main* against San Juan. The defences of this port were at the time in a backward state; but so strong a step was not in conformity with the passive naval attitude at first adopted. It remained only to establish a blockade of Havana, which, in the circumstances, was imposed upon the authorities. On the morning of April 22, therefore, the blockade was commenced, and extended from Cardenas to Bahia Honda, and afterwards round the west coast of Cuba to Cienfuegos (Pl. III.). "Monotonous and harassing work" was

* *The Times*, Dec. 26, 1898.
† *The Times*, Dec. 1, 1898.

thus at once thrown upon the squadron, varied only by the captures of trading vessels and by "occasional firings at newly formed batteries to prevent work, as at Matanzas, which were merely casual incidents magnified by a grandiloquent Press into battles." * The nominally considerable force of small cruisers and gunboats in the Spanish ports proved absolutely useless, and this preliminary phase of commercial blockade offers no points of special naval interest.

The action at Manila. On April 24, the following telegram was sent to Commodore Dewey at Hong Kong:—

> War has commenced between the United States and Spain. Proceed at once to the Philippine Islands. Commence operations at once, particularly against the Spanish fleet. You must capture vessels or destroy. Use utmost endeavours.

On the 25th, the whole squadron left Hong Kong for Mirs Bay, and sailed for Manila on the 27th. It was hopeless to attempt a fleet action in the open sea against the crushing superiority of his opponents, and, in retiring into Manila Bay and taking up a position off Cavite, where he could expect support from the coast batteries, Admiral Montojo took the only course open to him. On the 30th, the Boston and Concord, sent to reconnoitre, found Subig Bay clear, and at 11.30 p.m. Commodore Dewey led into Manila Bay by the south channel at 8 knots speed, slowing down when inside. The action commenced at about 5 a.m., the flagship opening fire at 5,600 yards, and the squadron, in single column line ahead, circled three times from east to west in front of the anchored Spanish ships, gradually closing from 3,000 to 1,900 yards (Pl. II.).

The Christina, carrying Admiral Montojo's flag, weighed and steamed towards the American ships, but was roughly handled, and set on fire, and an attempt by two torpedo launches to approach the Olympia was easily repulsed. Otherwise the action was purely passive on the Spanish side. After hauling off at 7.35 a.m., for rest and food, Commodore Dewey again opened fire at 11.15 a.m., and the work of destruction was completed. Eleven Spanish ships† were burned or sunk, and two tugs, with some small launches, were captured. The naval station, which was found to contain good workshops, was occupied, and the defences were destroyed. Admiral Montojo reported 381 men killed and wounded, afloat and ashore. The American squadron had four men slightly wounded and the ships suffered no damage. The action was purely an artillery duel, in which modern armaments, handled by well trained men, were opposed to guns, many of old type, in incapable hands. In such conditions, the great

* Captain F. E. Chadwick, U.S.N., *Scribner's Magazine*, Nov. 1898.

† Christina, Castilia, Antonio de Ulloa, Juan de Austria, Isla de Luzon, Isla de Cuba, General Lezo, Marques del Duero, Argos, Velasco, and Mindanao transport.

gallantry and endurance shown by the Spaniards could avail nothing. The following table shows the inequality of the armaments:—

United States.	Spain.
10 8-in. B.-L.	7 6·3-in.
23 6-in. „	7 5·9-in.
20 5-in. Q.F.	30 4·7-in.

The total number of rounds fired by the American squadron was:—

8-in.	157
6-in.	635
5-in.	622
6-pr.	1,987
3-pr. and 47-m.m.	648
1-pr. and 37-m.m.	1,632

Questions of naval construction or of protection did not arise on the American side, since the entire squadron escaped injury, and similar armaments similarly handled on board any vessels would have attained the same result. On the other hand, there can be no doubt that, when once superiority of fire is established, modern guns are capable of bringing the issue to a close far more quickly than their predecessors. The absolute failure of the Spanish coast batteries at Cavite, as elsewhere during the war, is amply explained by the want of training of the gunners, combined with technical deficiencies of every kind. While the action in Manila Bay was thus a foregone conclusion conveying only lessons of an obvious character, Commodore Dewey's proceedings on May 1 merit the highest commendation. The entrance channel leading into Manila Bay south of Caballo Island is 8000 yards wide (see Pl. II.), and the navigation is easy. Such a channel could not be effectively defended at night by artillery fire; but there were mines, which are popularly credited with great moral effect. In ignoring all risks, and, like Farragut at Mobile, making straight for his objective—the enemy's squadron—Commodore Dewey followed the best naval traditions, and fully deserved his success. The futility of maintaining on a far distant station a naval force absolutely unfit to meet that of a possible enemy was, at the same time, strikingly demonstrated. The naval weapon of the United States in the Far East, ready for war as that weapon can and should always be, was able to strike hard within a week of the receipt of orders, although the nearest national port lay 7,000 miles across the Pacific.

Results of action.

By the action of May 1, Commodore Dewey obtained absolute command of the sea, full control over the large inland waters of Manila Bay, and a firm footing on shore at Cavite. The town of Manila lay under the menace of bombardment, and the newly-created Admiral reported that it could "be taken at any time when a sufficient

number of troops were on hand to hold it." The navy having thus discharged its primary office, troops could be sent from San Francisco to the Philippines as soon as the necessary preparations were completed. In view of possible foreign complications, or of an attempt to send ships from Spain, it was decided to reinforce the Asiatic squadron, and the Charleston left Honolulu on June 4, convoying the transports City of Peking, Australia, and City of Sydney, with the first army detachment. Guam, the principal Spanish station in the Ladrone Islands, surrendered to this force on June 20. The monitor Monterey, with an attendant collier, sailed from the Pacific Coast on June 11, and the Monadnock, similarly accompanied, on the 25th. The military organisation of the United States was in an elementary condition, and the certainty that an expeditionary force would become essential, as soon as the long impending war with Spain broke out, appears not to have been realised in advance by Government or popular opinion. Naval success, however, almost invariably requires to be followed up by military force, and in the present day this condition can be rapidly fulfilled if due preparations have been made.

The Naval War in the East practically ended with the destruction of the Spanish squadron; but, in the difficult situation which preceded the surrender of Manila on August 13 and subsequently, Rear-Admiral Dewey showed the greatest tact and discretion.

Admiral Sampson moves east.

The news of the sailing of the Cape Verde squadron led to changes in the dispositions of the naval forces of the United States. On April 29, the St. Louis and Harvard at New York were ordered to proceed to the West Indies and to take up a cruising line between latitudes 14 and 17, about eighty miles East of Guadaloupe and Martinique respectively, until May 10. At the same time the Yale was ordered to cruise round Puertorico until the evening of the 13th, and then proceed to St. Thomas or elsewhere in search of information. On May 4, Rear-Admiral Sampson left Key West in the New York, and after picking up the Iowa, Indiana, Terror, Amphitrite, Montgomery, Detroit, the torpedo-boat Porter, and a collier, steered for the Windward Passage. After communicating with Washington from Cape Haitien, he decided to proceed to San Juan, and arrived off this port on the morning of May 12. An ocean speed of only 10 knots would have brought Admiral Cervera to San Juan on May 10; but, expecting doubtless that he would be met there in force by the Americans, he had decided to avoid the advanced base containing the coal which he sorely needed. It is interesting to note that if the squadron had crossed the Atlantic at 11 knots there would have been a sufficient margin of time, if proper facilities had existed, to

fill up with coal at San Juan. In this case, the squadron might have been sighted by the Harvard, but could have got to sea before being opposed in force. If, further, the four cruisers had been in an effective state and able to approach their nominal speeds, Admiral Cervera might have given much trouble to his opponents before being brought to action or blockaded in a Cuban port (Pl. I.).

Bombardment of San Juan.

Finding that the Spanish squadron was not at San Juan, Admiral Sampson engaged the coast defences on May 12 for about two and three-quarter hours, beginning at 5.30 a.m. The American ships cruised on an elliptic course, passing the batteries and circling to port three times in succession, thus following the first procedure of the Alexandra, Superb, and Sultan at Alexandria in 1882. In all, 1222 rounds were fired at ranges varying from 2000 to 4000 yards, the course of the ships being kept further out towards the end of the attack. The two works principally engaged were the Morro at the west and San Cristobal at the east end of the town, which was fairly protected by high ground. Their armaments were :—

THE MORRO.	SAN CRISTOBAL.
5 15-c.m. guns.	6 15-c.m. guns.
2 24-c.m. howitzers.	3 21-c.m. howitzers.

Other works, partially engaged, mounted four 15-c.m. guns and six 21-c.m. howitzers. The coast defences, which were about 110 ft. above the sea level, fired in all about 440 rounds, with the result that the Iowa and New York were each hit above the hull by a 15-c.m. shell, the latter ship at 5000 yards. The heavy fire of the American squadron caused slight damage to exposed masonry, but left the parapets practically intact. The breech of one howitzer was temporarily disabled by a shell splinter. In the works, three men were killed and thirty-nine wounded.* On the American side one man was killed and seven men wounded. The ships were practically uninjured.

It is not easy to assign a cause for this bombardment. As gunnery practice under war conditions it was doubtless useful, but the withdrawal of the squadron enabled the Spaniards to claim a victory, and in other circumstances the moral effect thus produced might have had some importance. The experience fully confirmed that of Alexandria, that the fire of ships is not able to dismount guns or seriously injure coast batteries. In addition to four 13-in., four 12-in., eight 10-in. and twenty-two 8-in. B.-L. guns, the American squadron carried twenty 5-in., fourteen 4-in., and smaller Q.-F. guns, and is said to have fired about 2000 rounds, 4-in. and upwards. Nevertheless, the

* In addition, nineteen civilians were killed and wounded, and this number would have been much increased if the shells falling in the town had not frequently proved blind.

fire of the Spanish batteries was not silenced,* and it is clear that moderately trained gunners would have inflicted serious injury upon the ships which, at this juncture must have been exceedingly inconvenient.

Rear-Admiral Sampson's squadron was now about 1000 miles from Havana, which it was supposed to cover. Its speed was little over five knots, on account of the presence of the monitors, whose coal supply was already running short, by which towing was necessitated. After reporting, "the United States fleet in great need of repairs," the Admiral returned westward, and received *en route* the following despatch :—

The Spanish fleet from Cape Verde Islands off Curaçoa, West Indies, May 14. Flying Squadron *en route* Key West, Florida. Proceed with all possible despatch Key West.

The disappearance of Admiral Cervera's squadron was popularly regarded as a portent. In Madrid, his proceedings were characterised as "a triumph of strategy," and it was reported that "public opinion is becoming more optimistic." † Admiral Cervera had, however, simply steamed at a remarkably slow speed to Martinique, and was off the south side of this island in the evening of May 11. Having decided to avoid Puertorico, there were reasons for his selection of this point of entry into the Caribbean Sea. From Fort de France a French cable communicates direct with Puertorico and Cuba, and also with Spain, *viâ* Para. The Furor was sent into Fort de France, and despatches were probably sent and received.‡ The Terror arrived on the 12th, and remained for some days, subsequently reaching San Juan unmolested. Steaming south-west, Admiral Cervera was off Curaçoa (500 miles from Martinique) on the 14th, where his presence was immediately reported by cable. Here a little coal was taken on board by the Vizcaya and Maria Teresa, and the whole squadron except the Terror steamed slowly to Santiago, where it arrived on May 19. An arrangement which had been made for coaling off the Venezuelan coast from the British collier Restormel broke down, and the squadron at length reached Santiago with bunkers depleted (Pl. IV.).

Assuming that Admiral Cervera's object was to reach Havana, it was evidently probable that, if this plan appeared too dangerous, he would make for Cienfuegos, which is in railway communication with the Cuban capital. Information received at Washington pointed to this port as the destination of the Spanish squadron. When, on May 13, it was at length deemed safe to move the Flying Squadron

* The fire is reported officially to have been "very heavy."
† The special correspondent of the *Times*.
‡ It is remarkable that just at this time telegraphic communication between St. Vincent and St. Lucia was reported to be interrupted.

Plate III.

CHART SHOWING DAILY POSITIONS OF FLEET IN CAMPAIGN AGAINST SPANISH SQUADRON UNDER ADMIRAL CERVERA

From May 15, 1898 to July 3, 1898.

North Atlantic Fleet
Flying Squadron
Spanish Squadron

The positions shown are those of the flagship in each case, except that the Spanish positions are those taken from the log of the Cristobal Colon.

from Hampton Roads, Commodore Schley was ordered to Charleston, and later to Key West, whence he sailed on May 19 with the Brooklyn, Texas, Massachusetts and Scorpion * under orders to establish a blockade of Cienfuegos. On the following day the entry of Admiral Cervera into Santiago was known at Washington, and the Iowa and Castine with a collier were ordered to sail from Key West to reinforce Commodore Schley. It resulted from the American dispositions that between May 4, when Rear-Admiral Sampson sailed eastward and the 18th when the Flying Squadron reached Key West, there was no force near Havana decisively superior to the four Spanish cruisers. And further, if Admiral Cervera could have coaled rapidly at Santiago it is probable that he could have evaded the Flying Squadron and reached Havana by the Yucatan Channel. The issue of the war would have been the same, but the difficulties of the Americans would have been greatly increased (Pl. V.).

Resources of Santiago.

At Santiago, according to Lieut. José Müller y Tejeiro,† there were 2300 tons of Cardiff coal belonging to the navy, and "besides this, General Linares placed at Admiral Cervera's disposal about 600 tons of Cumberland coal from the Juraguá mines and 600 tons from the Sabanilla Railway." Facilities for putting this coal on board did not exist.

> The army wanted a tug, the military government wanted a tug and launches, and the fleet wanted launches and a tug, and all the services were important and urgent, and at the captaincy of the port we had constantly to solve problems that had no solution, and to furnish launches that were not to be found. . . . One detail will show the lack of means available at the port. Although every store in the town was visited, and any price offered for baskets, only a very limited quantity could be found for carrying the coal. . . . . The ships, which never stopped coaling as long as they stayed at Santiago, never succeeded in filling their bunkers.

It may, however, be reasonably doubted whether adequate energy in coaling was displayed.

Voyage of Oregon.

At this juncture the Oregon arrived after her fine voyage of 14,000 miles. This battleship left San Francisco on March 19, preceded by the Marietta gunboat, which was ordered "to facilitate in every way possible" ‡ her passage to the Caribbean Sea. The Marietta made arrangements for coaling at Callao, where the Oregon took on board 1100 tons of coal in eighty hours. She left on April 7 for Sandy Point, Patagonia, whither the Marietta had preceded her. Near the Straits of Magellan a heavy swell was encountered, and off Port Tamar in thick weather she was "for a time awkwardly placed," §

* The New Orleans was left at Hampton Roads.

† "Second in command of Naval forces of the province of Santiago." His interesting work, "The Battles and Capitulation of Santiago," published at Madrid, has been translated in the United States Office of Naval Intelligence.

‡ Report of Secretary of the Navy.

§ Report of Captain C. E. Clark, U.S.N.

but arrived at Sandy Point on April 17, where she coaled from a hulk. The run from Callao was at an average speed of 11¾ knots. Rio Janeiro was reached on April 30, and news of the outbreak of war and of the sailing of Cervera's squadron was received. Here the Brazilian authorities undertook to convoy the Spanish torpedo gunboat Temerario "to an anchorage well up the Bay" if she arrived. After again coaling, the Oregon left on May 4 and reached Bahia on May 8, leaving the Marietta and Nictheroy at sea near Cape Frio, with orders "if need be, to run ashore if there was no other way to avoid capture." From Bahia Captain Clark telegraphed "The Oregon could steam 14 knots for hours, and in a running fight might beat off or even cripple the Spanish Fleet." On May 9, the Secretary of the Navy telegraphed—

Proceed at once to West Indies without further stop Brazil. No authentic news of Spanish Fleet. Avoid if possible. We believe that you will defeat it if met.

On May 18, the Oregon anchored off Bridgetown, Barbados, and asked and obtained permission to take in 400 tons of coal. On May 24, she arrived off Jupiter inlet, Florida, and was ordered at once to Key West.

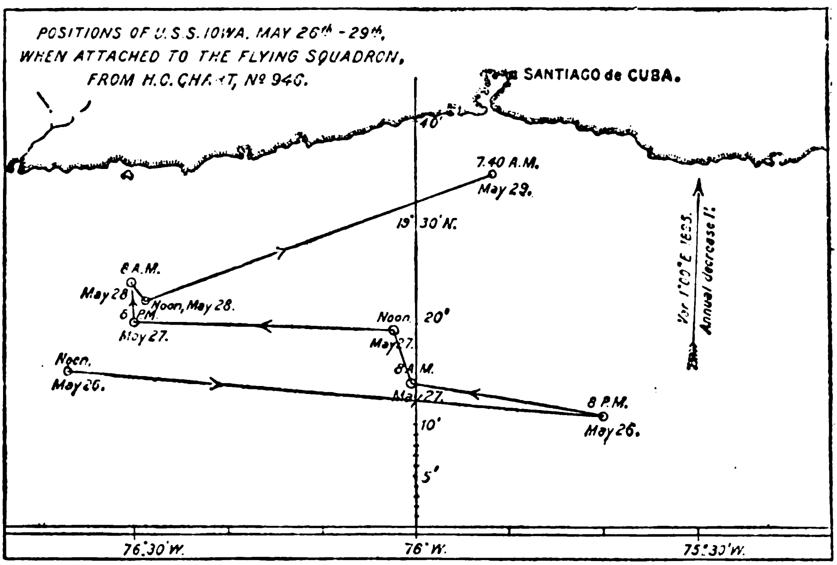
Concentration of American Fleet.

Now that the Oregon had arrived and the Flying Squadron had moved south, the mass of the American Navy was off the coast of Cuba, and its only enemy was represented by the hapless squadron of Cervera in the harbour of Santiago. Unless this squadron could coal rapidly and escape it was obviously doomed. If it could have filled up with coal and supplies and gone to sea on May 22, and if it had possessed any speed, it might, as has been said, have reached Havana. Sailing on this date it could, in any case, have reached San Juan without molestation. Havana was, of all Cuban ports, the easiest to blockade, on account of its proximity to Key West; but the difficulties of a land attack were considerable. Conversely, San Juan was the most difficult port to blockade; but, judging from subsequent events, the military operations would have been relatively easy (Pl. V.).

Proceedings of Flying Squadron.

Cienfuegos, like other harbours peculiar to Cuba, is a deep inlet, with a narrow entrance, hiding ships within. On May 24, Commodore Schley sent a despatch to Rear-Admiral Sampson, stating that he had ascertained that the enemy was not in Cienfuegos, that coaling was difficult, and that he proposed to steam eastward, but would be unable to blockade. On the evening of the 24th, Commodore Schley sailed eastward, and at 5.30 p.m. on the 26th was some miles to the south and east of Santiago, when he was stopped by the need of repairs to the collier Merrimac. He now determined

to return westward by the Yucatan Channel to Key West, and started at 7 p.m. On the 27th, however, he was joined by the Harvard from Mole St. Nicholas, Haiti, with orders to the effect that, since all information pointed to Cervera's presence at Santiago, he was "to ascertain facts, and that the enemy, if therein, does not leave without a decisive action." At noon, the Harvard left the "Flying Squadron" with Commodore Schley's reply, stating, "Much to be regretted, cannot obey orders of Department. Have striven earnestly; forced to proceed for coal to Key West by way of Yucatan Passage." Later on the same day, however, the Texas and Marblehead were able to take in coal from the Merrimac; and on the 28th, at 1.15 p.m., the squadron returned eastward, and lay ten miles off Santiago during the night. Early on the morning of the 29th Cervera's force was seen to be in the harbour. The movements of the Flying Squadron from May 26th to 29th are indicated below. (See also Pl. III.)



Meanwhile Rear-Admiral Sampson, with such ships as could be spared from the blockade of Havana, had taken up a position in the Nicholas Channel, covering the approach to Havana from the eastward. On receiving Commodore Schley's despatch of May 27th, he decided to return to Key West for coal; and on the same day, the 27th, the New Orleans, with the collier Sterling, was ordered to proceed at full speed to Santiago. On the 29th, the New Orleans joined Commodore Schley, and on the 31st she took part

with the Massachusetts and Iowa in a preliminary long range bombardment of the forts and the ships in harbour (Pl. III.).

Thus ten days elapsed after Admiral Cervera entered Santiago before his presence there was established by Commodore Schley. Further, the squadron, which at length found itself in a position of observation of the harbour, was reported to be unable to blockade.

The situation from the 19th to the end of May was thus interesting and instructive. The St. Louis was off Santiago on May 18, and exchanged shots with the batteries. The St. Paul and Yale arrived on the 21st, followed by the Harvard. On May 25, the Cristobal Colon must apparently have been in view of any cruiser which stood close in to the port;* but the presence of the Spanish Squadron was not visually ascertained till the 29th. This seems to have been a case in which, if ever, a captive balloon sent up from a cruiser might have been of service. The military balloon employed with General Shafter's force only served to draw the enemy's fire (Pl. VI.).

Blockade established.

Rear-Admiral Sampson, never doubting that the Spaniards were at Santiago, returned from the Nicholas Channel to Key West for coal, and sailed on May 30 with the Oregon, Mayflower, and Porter, arriving off Santiago on June 1 (see Pl. III.). The blockade was now established in great force and never relaxed. The whole of the American battleships, the fine armoured cruisers New York and Brooklyn, with many other craft of all kinds, kept watch and ward till the final catastrophe.

Results of Admiral Cervera's entry into Santiago.

The squadron of Admiral Cervera, in the state in which it was, courted certain destruction by entering such a harbour as Santiago, Well suited for concealment and protection, it was not easy of exit, and the proximity of Guantanamo Bay offered a great advantage to a blockading fleet. If the Spanish cruisers had been able to approximate to their legend speeds,† and if they could have been quickly coaled and supplied at Santiago, Admiral Cervera might have continued for some time to maintain the menace which was at first permitted to hamper the naval operations of the Americans. But Admiral Cervera's squadron did not really fulfil the first condition of "a fleet in being," since it was not an effective fighting body. The reflex influence, even of wholly incompetent sea-power, may, however, prove extremely important, and by entering Santiago Admiral Cervera changed the whole situation. Santiago, which sheltered the

* Lieut. Müller y Tejeiro states that on this day the Colon "anchored south of Punta Gorda," so as to bring her broadside to bear on the channel.

† Considering the state of the Vizcaya's bottom, the improbability that the remaining cruisers had been docked immediately before sailing for St. Vincent, and the effect of a month's stay in the tropical inland waters of Santiago harbour, the final performance of the squadron appears to be far from discreditable to the Spanish engineers.

CARIBBEAN SEA

With Cables.

SANTIAGO HARBOUR

† Position of the sunken Merrimac.

enemy's naval force, must now be captured, and could be captured only by the aid of a military force. Havana, where preparations had been made, and the military difficulties confronting the United States were considerable, could be neglected. Santiago and the Spanish squadron once taken, there was reason to believe that the objects of the war could be attained. A direct and immediate objective thus presented itself, and the American operations at once assumed definite form.

Admiral Vernon's attempt in 1741.

It is interesting to remember that at a council of war held at Government House, Jamaica, on May 26, 1741, Vice-Admiral Vernon, Rear-Admiral Sir Chalmers Ogle and Generals Wentworth and Guise resolved to attack Santiago, in opposition to the views of Governor Trelawny. The expedition of 41 sail carrying about 4000 "land forces and blacks" arrived off Guantanamo Bay on July 18. Here a party of 100 American troops and 100 blacks landed and reconnoitered inland, meeting no opposition. The intention was to carry Santiago by *coup de main*, the fleet assisting by a bombardment of the Morro. On August 5, however, the general informed the admiral that his supplies were insufficient, and that without guns he could not carry the place. The naval officers held to a contrary opinion; but, after another council of war, the project was abandoned and the force re-embarked. In conditions little differing from those of 1741, the attack of Santiago was now to be undertaken by American troops, no longer acting as pioneers of a British expedition, but in the name of a great nation then non-existent.

Sinking of the Merrimac.

The orders of May 27 despatching the New Orleans and the colliėr Sterling to Santiago, directed that the latter might be used to obstruct the entrance of the harbour. The channel at one point is only about 350 feet wide (see Pl. V.), and if a cargo steamer could be sunk in the right place, the egress of the Spanish cruisers would be effectually barred, and the harassing duties of a blockade would be avoided or greatly mitigated. The difficult and dangerous task was attempted shortly before daybreak on June 3 by Naval Constructor Hobson with a volunteer crew of seven men in the collier Merrimac. Careful forethought and the utmost gallantry failed to accomplish the desired result, and the Merrimac, whose steering gear was previously damaged, was sunk outside the fairway. A heavy fire had been directed on her, and the Reina Mercedes and Pluton each discharged two Whitehead torpedoes. Two submarine mines were fired in the first line and one in the second without any result. This, as the Spanish writer justly observes, "shows that the effect of torpedoes is moral rather than material, and that it is not

easy to discharge them at the right moment. To do so requires a degree of experience, a range of sight and a presence of mind not easily found united in a single man," who, moreover, cannot as a rule be practised in his difficult *rôle*. The exploit of Naval Constructor Hobson and his volunteer crew was worthy of the highest naval traditions, and under easier conditions of navigation the attempt would probably have succeeded. In any case, it seems clear that submarine mines, if intended for other than moral effect, must be used with caution in a narrow channel of approach to a harbour containing a squadron which contemplates employment at sea. If the mines at Santiago had attained the object for which they were apparently intended, the Spanish Squadron would have been definitely imprisoned. On the other hand, that imprisonment would have added greatly to the subsequent difficulties of the Americans, to whom the failure to block the channel proved to be an unmixed advantage.

Defences of Santiago.

The coast defences of Santiago were of an elementary description. The Morro, on the east side of the entrance, was an ancient masonry work. An adjacent battery, with a parapet formed of boxes filled with cement and sand-bags, had been roughly built. On the parapet, between the gun positions, cement barrels were placed. These improvised works mounted 5 16 c.m. bronze guns of the seventeenth and eighteenth centuries, and 2 21 c.m. howitzers, all muzzle-loading. The Socapa battery on the west side was similarly constructed, and had 2 16 c.m. B.-L. Hontoria guns transferred from the Mercedes, together with 2 8 c.m. old M.-L. guns and 3 21 c.m. M.-L. howitzers. In rear of these batteries, trenches had been dug to give cover to men not serving the guns, and little zigzags provided access to the emplacements. The Morro and Socapa works bore the brunt of the bombardments, and upon them the artillery defence of the harbour depended. They were on high ground, which, if occupied, would have enabled the mines and obstructions to be removed. Below and east of the Socapa battery 1 5·7 c.m. Q.-F., 4 3·7 c.m. revolving Hotchkiss, and 1 1·1 c.m. machine gun, all landed from the Mercedes, defended the mine-field. Punta Gorda battery, with a small arc of fire (see Pl. V.), had 2 15 c.m. B.-L. howitzers and 2 9 c.m. bronze B.-L. Krupps, but was only occasionally engaged. The retired position of this work rendered it difficult to attack, and it could have been effectively employed only if the attempt to force an entrance had been made. There were in addition 2 21 c.m. M.-L. howitzers, 2 8 c.m. B.-L. guns, and 2 12 c.m. short M.-L. bronze guns in Estrella battery which were never engaged.

Commander Jacobson gives the following table, showing the guns in position at the dates of the various bombardments.*

DATE.	MORRO.	SOCAPA.	PUNTA GORDA.
May 18	1 16 c.m. M.L. on wooden carriage, could fire only three rounds	2 8 c.m. M.L.	2 15 c.m. Hontoria M.L. howitzers
„ 31	Ditto, and 4 16 c.m. M.L.	Ditto	Ditto
June 3	Ditto	1 16 c.m. Hontoria	Ditto
„ 6	Ditto	Ditto, and 1 16 c.m. Hontoria naval	Ditto, and 1 16 c.m. Hontoria naval
„ 14	Ditto	Ditto	Ditto
„ 16	Ditto	Ditto	Ditto, and 1 16 c.m. Hontoria naval
„ 18	Ditto	Ditto, and 2 21 c.m. M.L. howitzers	Ditto
July 2	Ditto, and 2 21 c.m. M.L. howitzers	Ditto, and 1 21 c.m. M.L. howitzer	Ditto

Excluding Punta Gorda, which could act effectively only if an attempt were made to force the entrance, the only modern armament against which the American Fleet was pitted consisted of 2 16 c.m. guns in Socapa battery.

For the service of the above and some guns mounted near the town, there were seventy-seven gunners. The Spanish ships were at first disposed so as to bring their fire to bear upon the channel. Thus on the night when the Merrimac entered, the Mercedes lay between Socapa and Cay Smith, bringing her two bow 16 c.m. guns and her torpedo-tubes to bear. Two lines of mines crossed the channel, and were passed in safety by the Merrimac. On June 8, a steel cable buoyed by planks was stretched from Cay Smith to Punta Soldado to keep out torpedo-boats or floating mines, "which the enemy might attempt to send into the harbour with the entering tide." On June 20, a similar cable was stretched between Socapa and Cay Smith, and twelve additional mines were laid, half between Cay Smith and the sunken Merrimac, and the other half between the latter and Punta Soldado. On June 22, a considerable force was landed from the squadron to participate temporarily in the land defence of Santiago. As, however, the idea of sending the ships to sea was not abandoned, their resources were not, like those of the Russian Fleet at Sevastopol, placed wholly at the disposal of the defence. In spite of their miserable inefficiency and insufficiency, judged by approved modern

* "Sketches from the Spanish-American War," *Marine-Rundschau*, Berlin. Translated in Naval Intelligence Department. Commander Jacobson, with the German cruiser Geier, was permitted to pass in and out of the blockaded Cuban ports.

standards, the harbour defences served their object. Where Santiago proved ruinously defective was in coaling facilities and in supplies—matters frequently neglected in favour of an extravagant and useless elaboration of coast defences. From the Athenian siege of Syracuse in 414 B.C. to that of Sevastopol, history shows that the defence of positions of this nature depends wholly upon sea-power. If the naval conditions are such as to permit an enemy to attack them, it is the back door—the land front—which is invariably selected. The operations against Santiago supply only a fresh illustration of an ancient law.

Operations of the blockade.

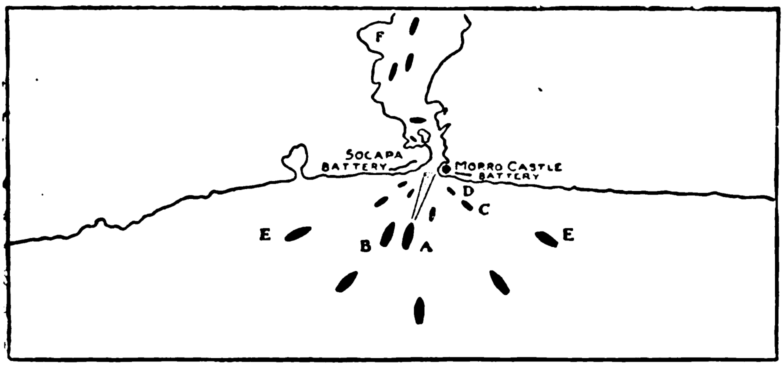
The attempt to obstruct the entrance channel having failed, it was necessary to establish a rigorous blockade, and for this purpose, now, as always, a convenient harbour at a moderate distance becomes an urgent requirement. Key West was 750 miles away; but Guantanamo Bay at only 50 miles was well adapted. On June 7, the Marblehead and Yankee entered the lower bay of Guantanamo, and the French cable communications with Santiago and Haiti were cut. On the 10th, a battalion of marines was landed. On June 15, a little fort on Caya del Toro, east of the narrow channel leading into the inner bay, was shelled by the Texas, Marblehead, and Suwanee. Guantanamo Bay was now completely at the disposal of the American fleet. The general dispositions of the blockading force were prescribed in Rear-Admiral Sampson's orders of June 2.

The fleet off Santiago de Cuba will be organised during the operations against that port and the Spanish squadron as follows:—First Squadron—Under the personal command of the Commander-in-Chief: New York, Iowa, Oregon, New Orleans, Mayflower, Porter. Second Squadron—Commander Schley: Brooklyn, Massachusetts, Texas, Marblehead, Vixen. Vessels joining subsequently will be assigned by the Commander-in-Chief. The vessels will blockade Santiago de Cuba closely, keeping about six miles from the Morro in the daytime and closing in at night, the lighter vessels well in shore. The first squadron will blockade on the east side of the port, the second on the west side. If the enemy tries to escape, the ships must close and engage as soon as possible, and endeavour to sink his vessels or force them to run ashore in the channel. It is not considered that the shore batteries are of sufficient power to do any material injury to battleships.

In smoother weather the vessels will coal on station. If withdrawn to coal elsewhere, or for other duty, the blockading vessels on either side will cover the angle thus left vacant.

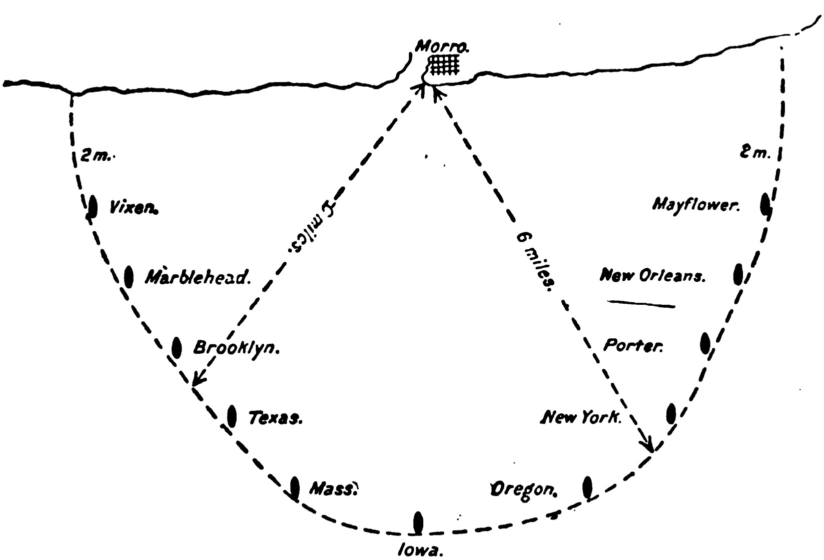
The above orders were amplified by others of June 7, which laid down dispositions for the night. The practical working of the matured arrangements is lucidly described by Captain F. S. Chadwick, U.S.N. "The battleships took two hour turns of service, beginning at dusk, when they moved in to such a range that the search-light would be thoroughly effective. . . . Inside the lighting ships were three picket vessels of the small auxiliaries, and still further in, three steam launches carrying each a 1-pr. in the bows with an armed crew eked out by an addition of four marines. These

were thus close under the cliffs, and were frequently subjected to musketry fire. The outer line was finally drawn in to a distance at which each ship was at night but two miles from the Morro." *



A Battleship with search-light.
B Supporting battleship ready to open fire in case of appearance of enemy.
C Three small cruisers as pickets.
D Three steam-launch pickets.
E Blockade outer line.
F Spanish ships.

The following diagram was issued with the orders of June 2 :—



Peculiarity of conditions.

That the above arrangements were found practicable was due to three peculiarities in the conditions. In the first place, the

* *Scribner's Magazine*, November, 1898.

entrance channel was exceptionally narrow; in the second place, the Spanish guns were mostly obsolete; the gunners were incapable, and there were no electric lights on shore. Half-a-dozen 6-in. Q.-F. guns, manned by trained detachments, aided by lights, would have sufficed to keep the American ships at a respectful distance. As it was, the electric lights of the battleship on inshore duty "shone through the entrance and over the intervening hills as far as Santiago, six land miles distant,"* preventing any craft from moving out of the harbour without being detected, and "during the whole period of nearly a month not a shot was fired by the enemy at any one of the ships while on this duty." Thirdly, there was no effective torpedo-boat flotilla inside capable of making determined attacks on the blockading vessels. At daybreak on May 29 the destroyers Pluton and Furor went to sea for a few hours, but subsequently attempted nothing, and the blockading force was relieved from the special strain which liability to torpedo attack may involve. The closing-in of the American ships at night is a sufficient proof that the torpedo-boat menace was ignored. On the other hand, the four torpedo-boats attached to Rear-Admiral Sampson's command could not be risked against the obstructions and the small quick-firing guns of the defenders, and were only employed on general duty, "with the final result of complete break-down and uselessness, notwithstanding the care and overhauling received at Guantanamo."* In the circumstances, the torpedo-boat could give no proof of its fitness for the purposes of war, but its incapacity for continuous service off Havana or even in the comparatively tranquil waters of the Caribbean Sea, was amply demonstrated.

The naval bombardments.

The routine of the blockade was occasionally varied by bombardments of the harbour defences of the adjacent coast-line, and partially of the town. On June 6th the Morro and Socapa batteries were heavily shelled for nearly three hours, and again on June 16th and July 2nd for about one and a half and two hours respectively. These and minor attacks caused the following total losses among the forces which the Spaniards were obliged to keep in these positions:—†

	Killed.	Wounded.	Total.
Morro	4	67	71
Socapa	2	14	16

In the second bombardment, one gun in the Socapa battery was temporarily put out of action by the *débris* thrown up by a 13-in. shell bursting near it, but was cleared the same evening. In the third bombardment one gun was dismounted. Otherwise the guns

* Captain Chadwick, U.S.N. † Lieut. Müller y Tejeiro.

in these two wretched extemporised works escaped injury from the crushing fire to which they were subjected, and they appear to have been always able to reply, although without any effect. The Indiana was, however, hit by a 21-c.m. howitzer shell, which passed through the upper deck before bursting, but did little damage. In addition to these bombardments occasional interchanges of fire occurred. On the night of June 22, the Vesuvius fired two shells, and subsequently discharged her three tubes with much regularity, closing in towards the entrance of the harbour in the darkness. Accurate fire could not thus be obtained and no material damage seems to have been effected.

The landing of the expedition.

Shortly after arriving off Santiago Admiral Sampson asked for a force of 10,000 troops to take the heights commanding the entrance of the harbour and open the way to the fleet. The transports for the military expedition were reported ready on June 4; but in consequence of a rumour that an "armoured cruiser" had been "identified off the north coast of Cuba, . . . the sailing of Shafter's expedition was stopped until the report could be verified; whereby five or six valuable days were lost." * Excluding the squadron securely bottled in Santiago harbour, there was no Spanish armoured cruiser nearer than Cadiz, and the report was disbelieved by Rear-Admiral Sampson; but the incident is extremely significant. Dread of sending crowded transports to sea when an enemy's warships might be encountered was always manifested in sailing days, and is now more than ever justified. The moral effect of a non-existent naval enemy has, perhaps, never been more strikingly illustrated than on this occasion. On June 14, the expedition, consisting of about 13,000 troops, the pick of the American regular army, and 3000 volunteers, sailed from Tampa, the transports being managed by the military authorities, and on the morning of the 22nd the landing at Daiquiri, twenty miles east of Santiago, began. By establishing the blockade of Santiago the American Navy had set free the offensive force—the army—by which the issue must be determined. Daiquiri possessed a small iron pier which provided some assistance in landing stores. The troops, however, were landed on the beach, and the work was carried out by the boats of the squadron under Captain C. F. Goodrich, U.S.N., of the St. Louis, while the ships covered the operations by shelling the neighbouring coast-line and demonstrating off Cabanas. "Some fifty steam-launches and cutters" were furnished by the fleet, and about 7000 men were disembarked during the day. Admiral Sampson reported the landing "completed on the afternoon of the 26th." The Spaniards offered no opposition, and the proceedings closely resembled those which began at Old Fort on

* Captain Mahan, *Times*, January 2, 1899.

September 14, 1854. By September 18, 61,000 infantry, 1000 cavalry, and 128 guns were landed, in spite of the interruption caused by the heavy surf which arose in the afternoon of the 14th. The performance of 1854 can, therefore, challenge comparison with that of 1898. Like the Allies, the Americans had practically no knowledge of the country invaded, and the presence of the insurgent Cubans was thus a considerable advantage.

The land attacks.

The military difficulties of the expedition quickly became apparent. It was most inadequately supplied with artillery and transport. Its organisation was defective, and its composition heterogeneous. The country was densely wooded, mountainous, and roadless. The rainy season had begun. The fighting capacity of the insurgents proved disappointing. Admiral Sampson held to the opinion that the heights commanding the entrance to the harbour should be occupied by the land forces, thus enabling the fleet to force an entrance. This view seems to have been finally accepted by the military authorities at a conference held on June 20. Major-General Shafter, however, directed the preliminary movements from a transport off the coast, and whether by the accident of circumstance or by design, the march of the troops was deflected inland. Instead of proceeding to occupy the heights above Aguadores, therefore, the expedition, leaving its engineers at the base, became involved in a severe action on July 1, which led to the capture of the entrenched positions of San Juan and El Caney. Only the conspicuous gallantry of the American troops averted a serious repulse.* A naval demonstration was made against Aguadores, which had no effect on the situation, but the New York and Oregon were able to fire over the high ground into the town. A general assault was apparently contemplated at daylight on July 2, and a heavy bombardment of the Morro, Socapa and Punta Gorda batteries was accordingly carried out from 5.30 to 7.30 a.m. No assault took place, and the military operations were limited to an interchange of fire between the opposing forces entrenched at close quarters. At 11.30 a.m., Major-General Shafter telegraphed to the Admiral:—

> Terrible fight yesterday, but my line is now strongly entrenched about three-quarters mile from town. I urge that you make effort immediately to force the entrance and to avoid future losses among my men, which are already very heavy. You can now co-operate with less loss of life than I can.

In replying, the Admiral expressed a natural reluctance to risk his ships in the cramped channel leading into the harbour, but added:—

> If it is your earnest desire that we should force our entrance, I will at once prepare to undertake it. I think, however, that our position and yours would be made more difficult if, as is possible, we fail in our attempt.

* The loss of the Americans was about 1700 killed and wounded, that of the Spaniards 543.

A conference, arranged for the morning of July 3, was unexpectedly forestalled by Admiral Cervera.

Causes of Admiral Cervera's sortie.

The interesting series of telegrams between the Spanish authorities, which have been published in New York, throw a clear light upon the ignorance and indecision which prevailed in Cuba and in Madrid. There seems to have been an idea of sending the squadron to sea on May 24, but the ships were very short of coal and supplies, and at a council of war held at Santiago on this day it was decided to wait "till the Americans had moved on Puertorico." A despatch of June 3 shows belief at Madrid that Cervera could escape and join Admiral Camara in a movement to Manila. Marshal Blanco, however, opposed this hopeless scheme, considering that it "would produce such a depressing effect here that I doubt whether I should be able to cope with the situation, even by the use of force." On June 21, he telegraphed: "It would be preferable, perhaps, to come to Cienfuegos or Havana, or to go back to Spain. . . . It is better to take risks rather than to remain shut up in Santiago and to be compelled by hunger to surrender." At the same time he urged that Admiral Cervera should be placed under his orders, and to this the Spanish Government agreed. On June 24, both the Marshal and the authorities at Madrid urged an immediate attempt to escape. On the 25th, Cervera, who had no illusions, described his position and stated:

> An attempt to leave this port would mean our absolute certain destruction. . . . As it is absolutely impossible to escape in these circumstances, I intend to offer all the resistance in my power, and to destroy the ships in the last resort. . . . You will decide whether or not we are to go further to the sacrifice which I think useless.

On the following day Marshal Blanco pressed the Admiral to go to sea, and indicated the military view of the naval situation. "It appears to me that you exaggerate the difficulties of leaving Santiago. There is no need to fight." He again pointed out that several ships had been able to run the blockade of Havana, and added that the captain of the German cruiser Geier "has expressed his opinion that the squadron can effect its escape from Santiago without running great risk." Admiral Cervera now asked if he was to regard this as a definite order to move at once, and on the 28th Marshal Blanco recommended delay.

> My decision is that the squadron should remain quietly waiting for a favourable opportunity to depart, but in the event of affairs becoming grave to such a degree that you believe the fall of Santiago imminent, the squadron must leave immediately as best it can.

In reply, the Admiral pointed out that the ships would require twelve hours to get under steam, and if kept ready would each burn 15 tons a day. On July 1, Marshal Blanco ordered the squadron to

go out at "the earliest possible opportunity," and received a final protest in which General Toral joined. On the 2nd, Cervera was ordered to leave in 12 hours, and this decision was confirmed from Madrid. Two days after the final catastrophe Marshal Blanco telegraphed: "Perhaps if you had selected some other hour to leave port, the result would have been different."

The above correspondence is most instructive. The low state of efficiency of the Spanish squadron, pointed out by Cervera before he left St. Vincent,* and the want of resources at Santiago prevented escape during the days before the establishment of the close blockade. The Spanish Government, after deciding to despatch the only available naval force to the West Indies, seems to have entertained the fresh project of recalling it for action in the China seas, and the political considerations which suggested the first plan were naturally urged by Marshal Blanco against the second. The squadron had crossed the Atlantic ostensibly to support the Spanish cause in Cuba; to withdraw it, if this had been possible, would evidently produce "a depressing effect" throughout the island. Finally, we are presented with the spectacle of the soldier seeking to obtain authority over the sailor, and making light of the naval difficulties of a situation which he did not understand.† It is clear that neither Marshal Blanco nor his German adviser had attained to the smallest idea of the rigour of the blockade established at the beginning of June, and the suggestion that, because the Santo Domingo and the Montevideo escaped from Havana, the Spanish squadron could as easily leave Santiago was puerile. If, as Admiral Cervera seems to have contemplated, the crews and all the light armament of the ships had been placed unreservedly at the disposal of the land defence, the critical position of the American troops in July would have assumed a serious form and fresh military efforts would have been entailed. It resulted from the incompetence of the Government at Madrid, and from the game of cross purposes played between Havana and Santiago, that the squadron was destroyed and the fall of the town accelerated.

The action off Santiago.

During the night of July 2, some of the mines obstructing the channel were removed by the gunboat Alvaredo, and the squadron got under steam. At 9.30 a.m. on July 3 the Spanish ships were seen by the blockaders to be coming out at about 8 knots speed. The Maria Teresa (flag) led, followed at two cables' distance by the Vizcaya, Cristobal Colon and Oquendo successively. The Pluton was about six cables astern of the Oquendo, and the Furor brought

* See p. 129.

† Our own history furnishes many parallels of the military tendency to ignore the naval point of view.

up the rear of the column. The ships were navigated out of harbour by Cuban pilots, and after clearing the Diamante shoal they immediately altered course to the westward. There was thus no attempt to attack, but only to escape, following what would naturally be the line of least resistance.

The question of going to sea at night had been discussed; but the difficulties of navigation, due to the narrow channel with an awkward turn (see Pl. V.) were held to be too great to justify the measure. If one of the leading ships took the ground a collision could hardly be avoided. Moreover, the blockade was specially stringent at night,* and the channel was kept under the search lights. The idea of escaping by single ships does not seem to have been mooted. The squadron was to go out as a whole, trusting to be able to protect itself by fire until it succeeded in drawing clear of the blockading vessels. Admiral Cervera and his officers appear to have cherished no hopes of thus evading their opponents, and in Santiago it was believed that a fresh squadron from Spain was close at hand.

> I remembered everything I had read in newspapers about the purchase of ships, and the dates when those building had been launched. Everything became clear to me. We had ships and they were coming. No doubt they were quite near, or perhaps only a few miles off; but where had the ships come from? I do not know—from heaven, from earth, from the air, from nothing at all—I do not know. But everything appeared possible to me, except that our fleet should go out alone to fight the ships assembled off the Morro.†

When the Spanish movement was signalled by the Iowa, the blockading squadron was disposed approximately as shown below. (See also Pl. VI.) ‡

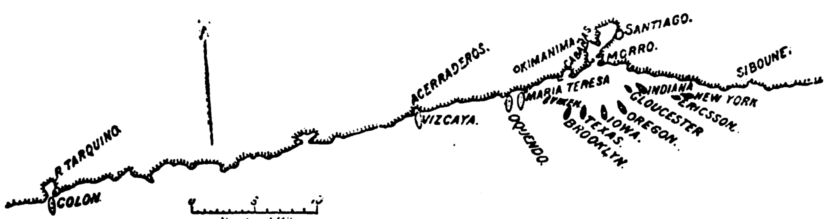


Chart showing positions of United States ships at the time the Spanish ships started from Santiago Harbour, July 3, 1898. Also positions of Spanish ships on the beach after the action.

The flagship had quitted her station between the Indiana and Oregon at 8.50 a.m., and steamed to Siboney. The Massachusetts, placed between the Iowa and Texas, had left at 4.0 a.m. for Guantanamo, in order to coal. The rest of the force at once closed

* See p. 131.
† Lieut. Müller y Tejeiro.
‡ Diagram taken from the report of Rear-Admiral Sampson.

in towards the enemy, and since the latter, with the exception of a temporary swerve out of column by the Vizcaya, as if with the idea of ramming the Brooklyn, simply held its course, attempting no manœuvres, the action was ruled entirely by the positions of the American ships, the available steam, and the relative speeds subsequently attained.

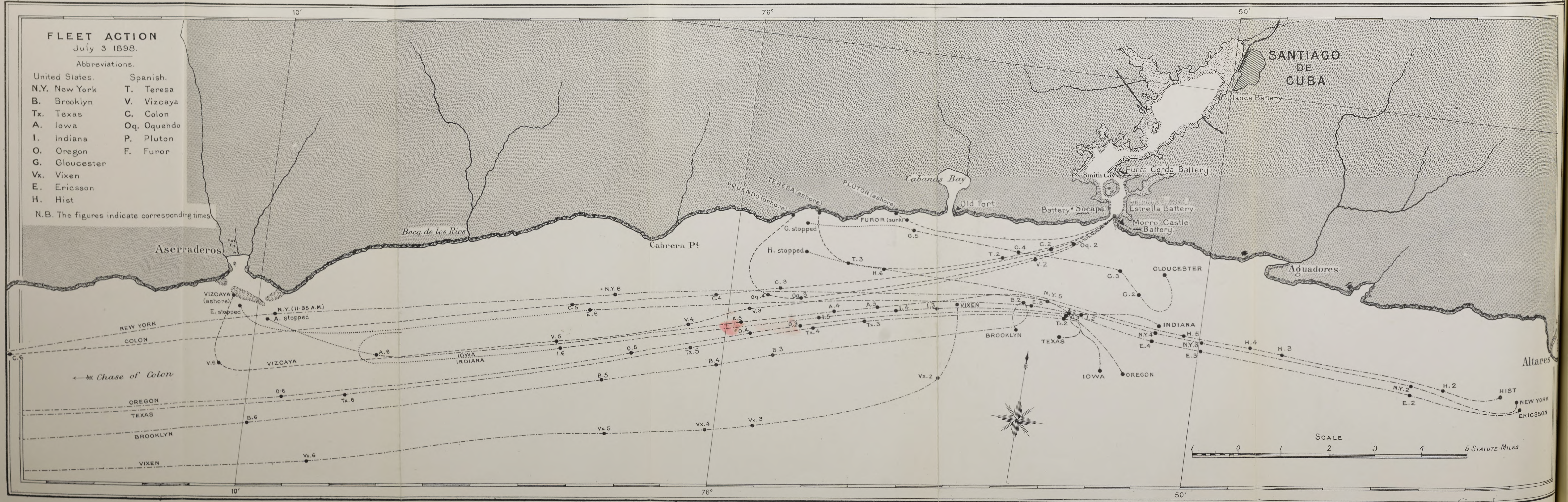
Brooklyn. Thus the Brooklyn, starting with steam in three boilers, and her forward engines uncoupled, opened upon the Maria Teresa with a raking fire from her port broadside, at about 1500 yards, and circling to starboard—a movement which must apparently have entailed difficulties on the Texas, then heading westward—brought her starboard battery into action. At about 10.15 a.m. the Maria Teresa headed in shore on fire, the Vizcaya and Cristobal Colon, holding on and gaining speed. The Brooklyn, at ranges from 1500 to 3000 yards, engaged the Vizcaya, which, at 10.53 a.m. was seen to be on fire, was passed inshore by the Colon, and at 11.5 headed for the land. The Brooklyn, now steaming 15 knots, took up the chase of the Colon, which had gained about six miles (see Pl. VI.).

Texas. Meanwhile, the Texas, closing in, opened on the Maria Teresa at 4200 yards, and subsequently engaged the Oquendo, which was masked for a time by the Oregon coming rapidly up. At 10.35, the Oquendo ran up a white flag and headed for the shore on fire. The Texas then opened fire at 6600 yards on the Vizcaya, until the latter ported her helm and ran ashore. Ultimately the Texas took up the chase of the Colon.

Iowa. The Iowa, having, at starting, only steam for 5 knots, opened on the Maria Teresa at 6000 yards, and headed to cross her bows, then starboarding and engaging with the starboard broadside at 2500 yards. The Iowa repeated these tactics in the case of the two following ships, ultimately chasing the Vizcaya, and helping to rescue the crew of the latter after she was beached.

Oregon. The Oregon, gathering speed rapidly, passed astern of, and poured a raking fire into the Maria Teresa as she headed in for the shore, and steaming on engaged the Oquendo, which began to turn before the American ship was fairly abeam. Steaming on at nearly 16 knots the Oregon engaged the Vizcaya, and then drawing up to three cables on the starboard quarter of the Brooklyn, joined in the chase of the Colon.

Indiana. The Indiana fired at all the Spanish ships successively, and then engaged the Maria Teresa and Oquendo at ranges from 4500 to 2000 yards, subsequently firing at long ranges at the Vizcaya. She was then signalled to return and "guard entrance of harbour," apparently with a view to prevent the exit of two armed steamers which still remained.


FLEET ACTION
July 3 1898.
Abbreviations.
United States.
N.Y. New York
B. Brooklyn
Tx. Texas
A. Iowa
I. Indiana
O. Oregon
G. Gloucester
Vx. Vixen
E. Ericsson
H. Hist
Spanish.
T. Teresa
V. Vizcaya
C. Colon
Oq. Oquendo
P. Pluton
F. Furor
N.B. The figures indicate corresponding times.
SANTIAGO DE CUBA
Blanca Battery
Punta Gorda Battery
Smith Cay
Battery Socapa
Estrella Battery
Morro Castle Battery
Old Fort
Cabañas Bay
Aguadores
Altares
Cabrera Pt
Boca de los Rios
Aserraderos
OQUENDO (ashore)
TERESA (ashore)
PLUTON (ashore)
FUROR (sunk)
VIZCAYA (ashore)
G. stopped
H. stopped
E. stopped
A. stopped
N.Y. (11.35 A.M.)
GLOUCESTER
INDIANA
BROOKLYN
TEXAS
IOWA
OREGON
VIXEN
HIST
NEW YORK
ERICSSON
NEW YORK
COLON
VIZCAYA
IOWA
INDIANA
OREGON
TEXAS
BROOKLYN
VIXEN
Chase of Colon
10′
76°
50′
SCALE
1 0 1 2 3 4 5 STATUTE MILES

The armed yacht Gloucester * opened fire with a 3-pr. Q.-F. gun beyond effective range, and was then held back gaining steam to wait for the two Spanish destroyers. Engaging the latter at 2500 yards she closed them at 17 knots, keeping both under fire. At about 10.16 a.m. the Pluton showed signs of distress, and running on shore blew up. Fire was then concentrated on the Furor, and the range decreased to 600 yards. The Furor was soon disabled, and began to circle with a port helm. Her fire ceased, and the boats of the Gloucester succeeded in taking off twenty-six men. At about 11.30, after several explosions, the Furor sank in deep water. **Gloucester.**

The chase of the Colon ended at about 1.15 P.M. The Brooklyn, which had 4½ boilers in steam and the remaining 1½ nearly ready, and the Oregon on her starboard quarter visibly gained during the last hour, and at about 12.50 P.M. opened fire from their bow guns at long range. Finding that 13-in. shells of the Oregon, fired at more than 9000 yards range, fell beyond him, Captain Diaz Moreu, of the Colon, turned towards the shore, fired a lee gun and hauled down his colours. The New York, Texas and Vixen were at this time coming up astern.

Three stages of the action.

The official reports, from which the above details have been taken, agree well, since the movements were of the simplest character. The action, which was fought by four battleships, one armoured cruiser and one armed yacht, against four armoured cruisers and two destroyers, may be divided into three parts:—

1. The general engagement which began as the Spanish Squadron left the harbour and headed west, every American vessel at once closing in and firing as her guns could be brought to bear.

This necessarily brought on a running fight in which the Spanish cruisers were engaged on their port sides. It resulted that the Maria Teresa, which led the squadron, received fire from all the American ships and was quickly overpowered. Immediately afterwards the Oquendo, the last ship in the column, succumbed, having been under the fire of all the battleships. The Vizcaya, which became the leader after the Maria Teresa had turned out of column, held on for a time under fire principally of the Brooklyn and Oregon, assisted by the Texas. The Colon, little injured, was able to take the lead and for a time to gain on her pursuers. During this part of the action, the most significant feature is the eagerness of all the American captains to press on so long as any Spanish ships remained undisabled. Thus the performance of the Oregon, which passed the Texas and Iowa and took up the chase of the Colon at 16 knots, is remarkable. The effect of her long voyage in securing full steaming efficiency was

* Late Corsair, N.Y.Y.C.

clearly shown. The experience gained by the engineers and stokers was strikingly asserted, and the moral is indisputable.

2. The chase of the Colon by the Brooklyn and Oregon.

The Spanish cruiser, which was practically uninjured, had succeeded in drawing out of range, but her nominal speed of 20 knots could not be approached. From the time of leaving the harbour the Colon averaged only 13·7 knots and was unable to maintain 15 knots, but when all the circumstances are considered, this low speed is not surprising. Thus the Brooklyn and Oregon soon began to overhaul her, and while it does not appear that she was ever hit at this period, the fact that the heavy shells of the Oregon began to range over her sufficed to end the attempt to escape. It is reported, however, that during the chase, while the Brooklyn held a straight course for a point off Cape Cruz, the Colon followed the bends of the coast-line as if in quest of a convenient spot for beaching. If able to maintain a speed of 17 knots the Colon would have escaped for a time; but without her heavy armament and with unpractised gun's crews she was unequal to a single action with the Brooklyn.* At 7.30 p.m. the Colon came afloat in deep water, and the New York's stem was placed against the stern of the Spanish cruiser, which was thus forced ashore, this somewhat delicate operation being performed by Captain F. E. Chadwick with the aid of the search light.

3. The independent action of the Gloucester with the Pluton and Furor.

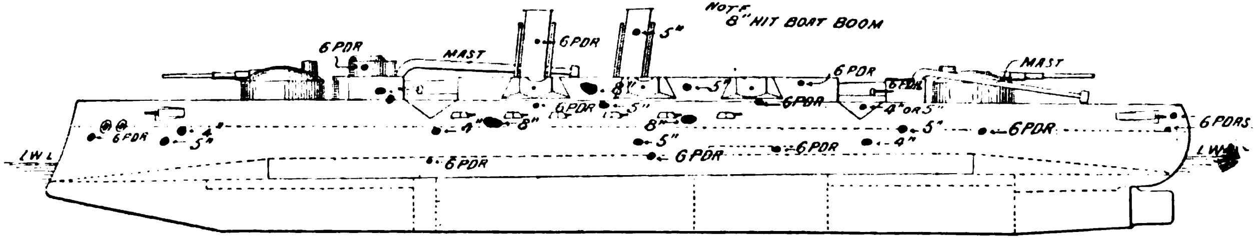
The onward movement of all the American ships left the Gloucester to deal with the destroyers, which, however, had already received fire from the secondary armament of the Texas, of the Iowa (at 4500 to 4000 yards), of the Oregon, and of the Indiana. It is, therefore, impossible to credit the four 6-pr. Q.-F., four 3-pr. Q.-F., and two 6-mm. automatic Colts of the Gloucester with the entire destruction of the Pluton and Furor. The latter each carried two 14-pr. Q.-F., two 6-pr. Q.-F., and two 1-pr. Maxim automatic guns. Each was, therefore, in theory superior to the Gloucester; but a single hit such as might have been previously received from the battleships would inflict serious injury on such light craft. It is to be noted that the destroyers made no attempt in their only proper *rôle*—the offensive.

Effect of fire.

With the exception of the Colon, the Spanish vessels were simply overpowered by the heavy fire to which their unpractised crews could not effectively reply. The American casualties were one man killed and one wounded,† both on the Brooklyn. The Spaniards lost at least 350 killed or drowned and 160 wounded, while 70 officers and

* The Colon had ten 6-in. Q.-F. and six 4·7-in. Q.-F. The Brooklyn had eight 8-in. B.-L. and twelve 5-in. Q.-F.

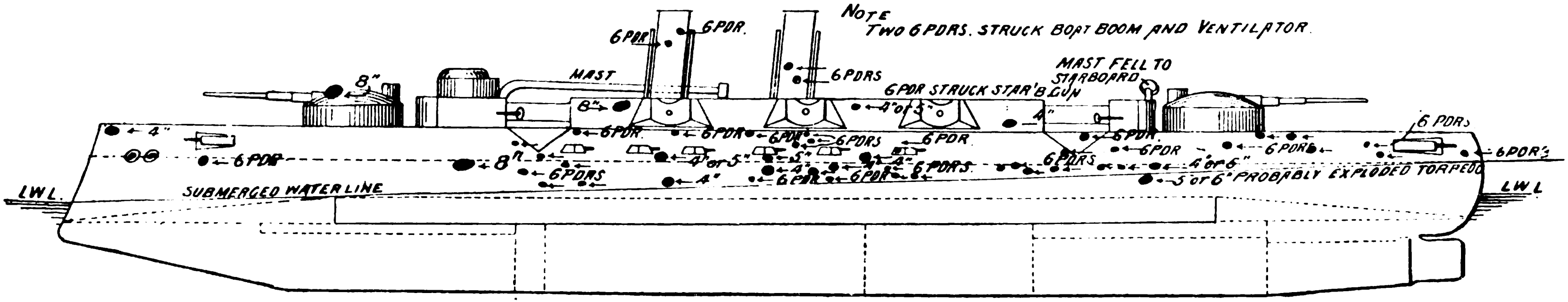
† Excluding men injured in the drum of the ear by concussion.



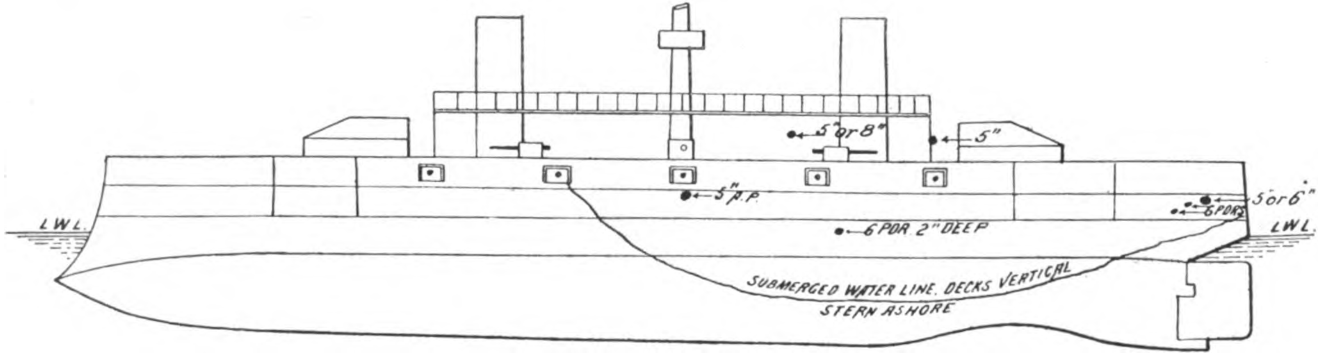
"VIZCAYA."

— ANALYSIS OF HITS —

CALIBRE	"VIZCAYA"	"OQUENDO"
8 in BL	5	3
6 in -	-	1
5 in QF.	7	3
4 in QF.	4	7
6 pr QF.	13	43



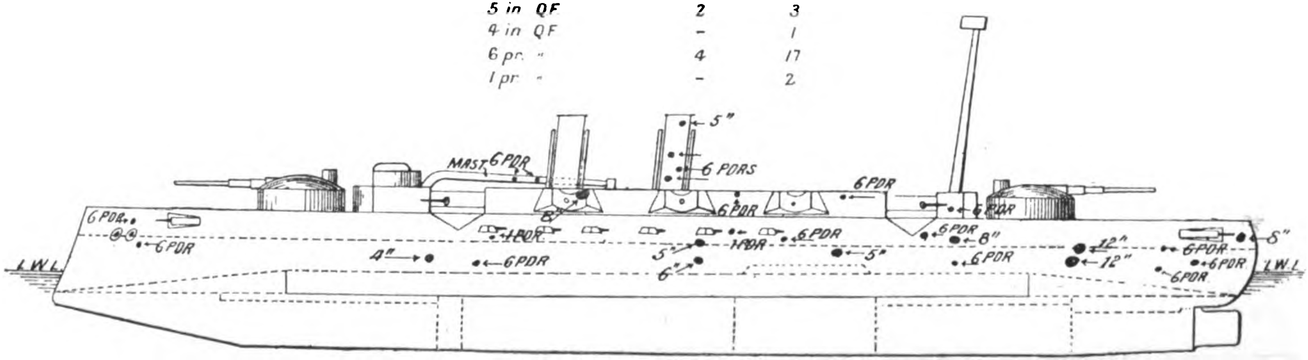
"OQUENDO."



"CHRISTOBAL COLON."

Analysis of Hits.

Calibre	"Colon"	"Maria Teresa"
12 in BL	–	2
8 in "	1	3
6 in "	1	1
5 in QF	2	3
4 in QF	–	1
6 pr. "	4	17
1 pr. "	–	2



"MARIA TERESA."

1600 men were taken prisoners. The loss would have been much heavier but for the strenuous efforts of the victors to save life. No American ship was seriously injured, and the result of the Spanish fire appears to have been:—

SHIP.	HITS.
Brooklyn	"About 25," mostly slight.*
Texas	1 splinter?
Iowa	2 above water-line berth deck.
Oregon	3
Indiana	2
Gloucester	*nil.*

The total number of rounds fired was:

	13-in.	12-in.	8-in.	6-in.	5-in.	4-in.	6-pr.	3-pr.	1-pr. & 37 mm.	Totals.
Brooklyn . .	—	—	—	100	473	—	1200	—	200	1973
Texas . . .	—	8	—	97	—	—	400	—	330	835
Iowa . . .	—	31	35	—	—	251	1056	—	100	1473
Oregon . .	34	—	123	41	—	—	1564	—	141	1903
Indiana . .	13	—	61	33	—	—	1744	—	25	1876
Gloucester .	—	—	—	—	—	—	589	780	?	
Totals . .	47	39	219	271	473	251	6553	780	796	

The effect of this fire of 8060 projectiles upon the four Spanish cruisers was carefully examined by a naval board. A few hits on the starboard side or on the burned woodwork may have escaped observation, otherwise the following table is correct:—

ANALYSIS OF HITS AND ROUNDS FIRED.

Calibre.	No. of hits on each vessel.				Total hits.	Total rounds fired.	No. of guns in action.	No. of hits per gun.	Percentage hits of rounds fired.	Ships firing.
	Vizcaya.	Oquendo.	Colon.	Teresa.						
13-in. B.L. .	—	—	—	—	—	47	8	0	0 %	Indiana, Oregon
12-in. ,, .	—	—	—	2	2	39	6	0·33	5·1	Iowa, Texas
8-in. ,, .	5	3	1	3	12	219	18	0·67	5·5	Iowa, Oregon, Indiana
6-in. ,, .	—	1	1	1	3	271	7	0·43	1·1	Brooklyn, Texas, Oregon, Indiana
5-in. Q.F. .	7	3	2	3	15	473	6	2·50	3·2	Brooklyn
4-in. ,, .	4	7	—	1	12	251	3	4·00	4·7	Iowa
6-pr. ,, .	13	43	4	17	77	5964	13	1·83	1·2	All ships
1-pr. Auto. .	—	—	—	2	2	796	42	0·15	0·2	Do.
Totals . .	29	57	8	29	123	8060	103	—	—	

* The hull of the Brooklyn was hit only by 6-pr. and 1-pr. projectiles. Two 4·7-in. shells struck the centre funnel and the cowl of the after ventilator respectively high above the deck.

Arithmetical analyses of the results of fire, in cases where equality of opportunity does not exist, are of little value; but some few points are worth notice. The sea was calm; but, as the Colon alone used smokeless powder, the difficulties of laying must frequently have been considerable. The fourteen heavy guns in action scored only two hits out of 86 rounds fired, both on the Maria Teresa. On the other hand, the percentage of hits obtained by the 12-in. guns was second only to that of the 8-in. In apparent accuracy of fire, the 4-in. Q.-F. guns of the Iowa beat the 5-in. Q.-F. guns of the Brooklyn. The fact that the 8-in. guns head the list, while the 6-in. stand lowest, shows the difficulty of scientific generalisation. The ranges were doubtless generally too long for the 6-pr. Q.-F., which obtained only 1·1 per cent. of hits. As regards the average number of hits per gun, the 4-in. Q.-F, and 5-in. Q.-F. easily beat the rest of the armament, the 4-in. guns of the Iowa being conspicuously successful. While, therefore, as at the battle of the Yalu, the heavy ordnance can scarcely be said to have justified its presence, the quick-firing gun again showed pre-eminence as a naval weapon.

Effect on the Spanish ships. Plates VII. and VIII. show the recorded distribution of hits on the Spanish cruisers. Both the main magazines of the Vizcaya were fired, and there were further explosions in the torpedo rooms fore and aft. The great structural damage thus caused prevented accurate estimate of the effect of the shells. It was considered that about half the hits were obtained as the ships were leaving the harbour, and the rest during the pursuit. On board the Oquendo the forward main magazine exploded. The port forward and after broadside torpedo rooms were also blown up, probably by shells striking torpedos. One shell struck and exploded at the forward turret, between the gun and the curved upper shield, killing the men inside and jamming the turret. The general effect of the fire is stated to have been "terrific," although only fourteen hits from guns larger than the 6-pr. were recorded. The 11-in. guns were reported in "excellent condition," while the 5·5-in. c.m. guns were apparently little damaged. There were no explosions on board the Maria Teresa, and the 11-in. and 5·5-in. guns and mountings were practically uninjured. The two 12-in. shells struck under the berth deck on the starboard side, wrecking the compartment and making a rent about 4 feet square. The Colon received no material injury. Speaking generally, the armaments seem to have suffered much less than might have been expected.

Lessons of the action. The action off Santiago teaches little or nothing as regards armour. The American battleships would have suffered little more if they had been protected cruisers. The belts of the Vizcaya, Oquendo,

and Maria Teresa were not tested. Light armour protection proved a source of danger, causing two shells on board the Oquendo and Maria Teresa to be exceedingly destructive. On the Spanish side, general deductions are vitiated by the fact that the Vizcaya, Oquendo, and Maria Teresa took fire almost immediately, and their crews were, therefore, subjected to special stress apart from the direct effects of the American projectiles. Whether they could have sustained a longer action if fire had not broken out we do not know. The lesson is obvious, and twenty-seven vessels of the American Navy have been or are being, wholly or in part, fitted with non-inflammable wood-work. Above-water torpedo-discharges are probably doomed, and the wisdom of providing cruisers with any torpedo armament may well be doubted. The medium Q.-F. gun, by the destruction which it can rapidly effect far beyond torpedo range, appears to have heavily discounted the under-water attack, and good gunnery is now more than ever important.

Difference of naval and military views.

The departure and complete destruction of the Spanish Squadron was a heavy moral blow to the defenders of Santiago, where the resources of the civil population were beginning to run short. The difficulties of the American land forces were, however, growing. They were entrenched within a short distance of the town, but a general assault could not be delivered without a great expenditure of life, since the want of guns prevented an adequate artillery preparation. On July 5, Major-General Shafter telegraphed to the Admiral:—

> The landing at Siboney is becoming very precarious, on account of the heavy surf which is beginning to prevail. Is it not probable that the troops on the west side of Santiago Bay near Cabanitas have left, and that place might be utilised as a landing-place for troops and supplies. . . . I fear we can use Siboney but little longer.

Shortly after the heavy fighting of July 1, apparently, the General telegraphed to the War Department: "I regard as necessary that the Navy force enter the harbour not later than July 6." This message was transmitted to the Admiral by the Secretary of the Navy, and received at Santiago on July 5. A difference of view, perhaps natural in such cases, thus manifested itself. The original proposal, that the land forces should occupy the heights commanding the entrance to the harbour, had fallen through for reasons which are not altogether clear. Instead of moving parallel to the coast line and utilising Aguadores as the landing-place of supplies, the expedition had been committed to an attack on the town of Santiago, and now found itself beset with growing difficulties where an easy military success seems to have been anticipated. In these circumstances, the General desired the Navy to under-

take a doubtful operation, while the Admiral, adhering to the absolutely sound views which he had upheld from the first, showed complete willingness to co-operate by taking any measures falling within the legitimate province of the navy. He had, in fact, previously ordered up the Resolute with countermines, and had offered to land a thousand marines at Estrella Cove to assault the Morro, or on the west side to take the Socapa batteries. The Spanish mine-field was at this time thoroughly disorganised, and probably of little value; but this could not then be known, and countermining operations were evidently impossible until the heights had been occupied. Meanwhile, on the night of July 4, the Mercedes was sunk by the naval commandant of Santiago, "in a manner which would certainly obstruct the larger ships, and possibly the smaller ones." * A deliberate naval bombardment of the town was therefore decided upon at a conference held on July 6, between Captain Chadwick and Major-General Shafter, who, at the same time, drafted a letter to the Spanish commander, proposing a surrender under a threat to open fire at noon on the 9th. This caused a general exodus of the greater part of the civil population, which congregated in the village of El Caney in a state of destitution. In the afternoon of July 10, the Brooklyn and Indiana fired 8-in. shell for about an hour. At 8.25 a.m. on the 11th, some trial rounds were fired, and at 9.35 a.m. a bombardment was opened by the New York, Brooklyn and Indiana, the fall of the shell being signalled, as far as possible, by observers before Santiago. The range was about 8000 yards, and the practice, under what were virtually peace conditions, was accurate. The Spanish account states that 59 houses were injured; but since the town was practically empty there was no loss of life, and the moral effect must have been inconsiderable.

Naval remarks.

The naval bombardment of Santiago.

Major-General Miles having arrived in the Yale, at once took up the landing project, and signalled to the Admiral on the night of the 11th.

> I would like to land troops from Columbia, Yale, and Duchess, west of Santiago Bay, and to follow it up with additional troops moving against the Spanish troops defending Santiago on west. I will be glad if you can designate most available landing place for disembarking troops and render all assistance practicable.

The demand of Major-General Shafter that the navy should force an entrance into the harbour, seems, however, to have been renewed, and a wild scheme for sending in one of the army transports with troops protected by hay bales appears to have been seriously entertained. On July 13, the Secretary of the Navy telegraphed to the Admiral.

* Report of Rear-Admiral Sampson. This afterwards proved to be not the case.

The commanding general of the army urges, and Secretary of War urgently requests, that navy force harbour; confer with commander of army. Wishing to do all that is reasonably possible to insure the surrender of the enemy, I leave the matter to your discretion, except that the United States armoured vessels must not be risked.

Meanwhile, on the 12th, Admiral Sampson made arrangements to bombard Santiago on the following day with the Oregon, Massachusetts, and Indiana, using 13-in. shell; but General Miles had already proceeded to the front, and negotiations were opened which ended in the surrender of Santiago on July 17.

General Remarks.

By first closely blockading, and afterwards destroying the Spanish squadron, the American navy discharged its primary functions in the most effectual manner. Henceforth, as after the sinking of the Russian fleet in the harbour of Sebastopol, the leading *rôle* fell to the army. If the navy had not rendered sea communication perfectly secure, the expedition would not have left Tampa. If there had been no expeditionary force, Santiago could not have been effectively attacked. The lesson is sufficiently venerable, but it has not yet been learned in this country. Judging with the knowledge which follows the event, there is little doubt that the plan, originally proposed by the Admiral, would have proved perfectly successful. The bridge at Aguadores was not destroyed. Once in possession of the heights above this place, the troops would have been more easily supplied, and all the works defending the entrance to the harbour could have been taken. A landing on the western side would also have offered little difficulty. The expedition, however, became involved in an attack on an entrenched position, for which it was in no way prepared, and, but for the sterling qualities displayed by the troops, a serious repulse might have occurred. Ill-fed, ill-equipped, and subjected to the utmost exposure during tropical rains, the forces were soon reduced by fever to a condition which would have been desperate in face of a more competent and enterprising enemy. Withdrawal from the front was, therefore, contemplated, and since the Spanish troops had provisions for about six weeks and were not short of ammunition, a fresh expedition would have been necessary. Santiago, throughout the operations, was practically open on the land side.* If therefore, good communication with Havana had existed, the difficulties would have been serious, although the ultimate result could not be doubtful. In any case, the surrender, which was arranged with great judgment by General Miles, was a timely relief from an unpleasant situation. Judged by the most moderate standard, the harbour defences of Santiago were miserable; but, in the circumstances, Admiral

*** The Cuban insurgents proved unable to prevent the entry of General Pando with 5000 men on the night of July 3.**

Sampson was fully justified in his reluctance to risk ships by forcing an entry.

Puertorico. On July 21, the Massachusetts, Columbia, Yale, Dixie and Gloucester left Guantanamo to convoy the expedition of General Miles to Puertorico. Guanica, Ponce and Arroyo were quickly occupied by naval landing parties, while the Puritan, Amphitrite and New Orleans maintained a blockade of San Juan. The lighthouse at Cape San Juan was occupied by a party from the Amphitrite on August 6, and successfully defended against an attack on the 8th. The brief and well-conducted campaign which followed was abruptly brought to a close by a general armistice.

Admiral Camara's movement. The extraordinary eastward promenade of Admiral Camara's squadron exerted no influence on the course of the war. On June 16, this squadron, consisting of the Pelayo, Carlos V., the armed fast mail steamers Patriota (Columbia) and Rapido (Normannia) with three destroyers and some colliers left Cadiz. The destroyers were left at Port Said; the warships passed through the canal and were then recalled to Spain. It is doubtful whether Admiral Camara could have reached Manila on account of difficulties in coal supply; but Admiral Dewey, reinforced by the Charleston, Monadnock and Monterey would have been well able to deal with the so-called Spanish "reserve squadron," and the movement caused no interference with the American arrangements. To restore the situation in the Philippines was wholly beyond the power of the Spanish Government.

The "Eastern Squadron." During June and July, measures for despatching a naval force to the coast of Spain were taken in hand. Between July 7 and 17 the Oregon, Massachusetts, Newark, New Orleans, Yankee, Yosemite, Dixie and Badger, were assigned to an "Eastern Squadron" to be commanded by Commodore Watson, and six colliers with a supply ship were held in readiness in Hampton Roads. The negotiations opened by M. Cambon at Washington on July 26 obviated the need for operations across the Atlantic.

Annexation of Sandwich Islands. On August 4, the Philadelphia arrived at Honolulu, then denuded of American troops who had passed on to Manila. The St. Paul, however, came in on the 6th with the 1st New York Volunteers, and on the 12th the flag of the United States was formally hoisted over the Sandwich Islands, and the first step in the expansion over-sea of the United States was taken.

The blockade. While the operations which led to the destruction of Admiral Cervera's squadron and to the fall of Santiago necessarily engrossed public attention, the duties of the general blockade of the long Cuban coast-line absorbed the energies of a large naval force. Up

to July 3, the modern warships were tied to Santiago, and the blockade was maintained by inferior and auxiliary vessels. By July 1, there were 100 ships of all kinds in commission in the North Atlantic, and to this large force there were subsequent additions. So long as it was believed that the Spaniards could send vessels across the Atlantic to harry the American coast line, a general concentration of the United States Navy in West Indian waters would not have been acceptable to the public. Even as late as July 17, therefore, Commodore Howell complained of the inefficiency of the blockade of the north coast and pointed out that traffic was being carried on "from Sagua la Grande and adjoining ports to Havana." For "a thorough blockade," between Baracoa on the east and Cape San Antonio on the west, he stated that he required at least twenty-six vessels. On July 27, Commodore Howell again called attention to the "very unsatisfactory state of affairs now existing." Similarly, on June 27, Captain Sigsbee of the St. Paul, in place of carrying out orders to proceed to New York for coal, came to Mole St. Nicholas in order to communicate with the Secretary of the Navy as to the total inadequacy of the blockade of San Juan, where the Yosemite remained alone face to face with "a well-fortified port containing a force of enemy's vessels whose aggregate force is greater than her own." San Juan was in fact practically unblockaded for many weeks. On June 27, Rear-Admiral Sampson sent a proposed distribution of the blockading force to the Secretary of the Navy, allotting twenty-seven ships to the southern and thirty to the northern coast of Cuba. At the same time he stated:—

There is no doubt that an addition of eight or ten vessels, carrying 5-in. guns, is needed in order to thoroughly patrol this coast line of nearly 2000 miles, a line greater in extent than that patrolled by nearly 600 ships during the civil war, and one in many respects offering greater difficulties.

Writing in June, 1897, Captain Mahan pointed out that "In case of a war with either Great Britain or Spain, this channel (between Florida and Cuba) would be likely to be infested with hostile cruisers close to their own bases, the very best condition for a commerce-destroying war." A year later war came, but the Florida and Nicholas Channels were controlled by the American Navy, and the possession of Cuba was only a source of weakness to Spain.

Excluding ships sunk by fire in Manzanillo Harbour on July 18th, the blockading force captured or destroyed ninety vessels, of which thirty-three were steamers. Of the warships captured or sunk, two protected cruisers, two unprotected cruisers, four gunboats, one torpedo-boat, and one transport were added to the U.S. Navy. This includes the Mercedes, raised at Santiago, and the Isla de Cuba, Isla de Luzon, Captures.

and Don Juan de Austria at Manila. The captured craft were mostly small, with the exception of the armed steamers Alfonso XII. and San Domingo, of 5,063 and 5,600 tons respectively. The former was sighted making for Havana at 11.45 p.m. on July 4th by the Hawk, a 545-ton yacht, armed with 2 6-prs. and 2 1-pr., and chased to the westward. The Alfonso XII. gained on her pursuers, but went ashore in attempting to enter the port of Mariel, and after being fired at by the Hawk and Castine was burnt by the latter. The San Domingo was sighted between the Isle of Pines and Cape Francis on the south-west coast of Cuba, by the Eagle yacht, of 492 tons, armed with four 6-prs. and two machine guns. The San Domingo, which carried two 4·7-in. Q.F. guns on her forecastle, after being chased for an hour by the Eagle, ran ashore, apparently because the pilot mistook the channel, was deserted, boarded, and burned. The San Domingo, in other hands, ought to have captured the Eagle. As a rule, the blockading ships, except when undertaking cable-cutting operations, kept clear of artillery on shore, and field guns effectively served would have been infinitely more formidable than most of the coast defences of Cuba. On July 18th the Wilmington and Helena (light draught gunboats), the Scorpion, Hist, Hornet (yachts), and the Wanpatuck and Osceola (tugs), destroyed by their fire the shipping at Manzanillo without incurring any casualties. On July 21st the Annapolis (gunboat), the Topeka (auxiliary third-class cruiser), the Wasp (yacht), and the Leyden (tug), entered the Bay of Nipe, defended by thirty mines, and destroyed the sloop Don Jorge-Juan, of 935 tons, armed with three 6·3-in. Palliser guns and two 3-in. Krupps. On August 12, the Newark, with the Resolute carrying a battalion of marines, and the gunboats Hist, Osceola, and Alvaredo, bombarded the defences of Manzanillo, which would have been surrendered on the following day if the armistice had not intervened (Pl. III.).

Everywhere, the United States officers showed the greatest energy, and when the large number of craft employed round a somewhat dangerous coast, the improvised crews of many of the vessels and the youth of some of their commanders are considered, the fact that accidents did not occur is a striking tribute to the seamanship—using the word in the wide sense—of the American Navy. On the other side, there was paralysis; nothing was attempted by Spanish ships in Cuban ports, and the gunnery of the coast defence was beneath contempt. "The Spaniards," said General Calixto Garcia to Rear-Admiral Sampson, "never attack; they *never* attack," and the truth of the words was amply confirmed. Indifferent as were the Spanish war vessels in Cuban ports, they must have been superior to some of the yachts and tugs which they never sought to engage.

Nevertheless, the blockade of Cuba and of Puertorico was for weeks far from effective. If the Spanish Government had possessed naval resources and had known how to use them, fast armed steamers could have entered and left Cuban ports with far less risk than that accepted by blockade-runners during the Civil War; but the miserable state of the internal communications of Cuba after nearly 400 years of Spanish rule would have impeded the supply of the beleaguered garrisons. The operations round Cuba show that, even in circumstances so exceptionally favourable as those of the Americans, the commercial blockade of a long coast line with numerous harbours is an exceedingly difficult task.

Scouting in the large sense assumed importance only when the destination of Admiral Cervera's squadron remained unknown. The arrival of the squadron at St. Vincent and the date of its sailing were immediately known at Washington. On May 12, it was reported off Martinique, and it again disappeared. On the 14th, its arrival off Curaçoa was telegraphed, and for the third time it vanished. On the 19th, the day of entry, it was reported to have reached Santiago, where on the 29th it was at length seen by the St. Paul, which had joined the Flying Squadron. The scouting arrangements thus appear to have failed, but Admiral Cervera's appearances were duly reported to Washington by telegraph. Whether on account of the fears manifested in regard to the safety of the Atlantic sea-board, or because the sea speed and fighting power of the Spanish cruisers were greatly over-estimated, the fast auxiliaries of the American Navy were not employed to the best advantage. The St. Paul and St. Louis might apparently have convoyed Admiral Cervera across the Atlantic. The measures taken have already been stated.* The St. Louis, after cruising off Guadaloupe, steamed to St. Thomas, whence she was ordered to join the admiral off Haiti. The Harvard, after cruising off Martinique, went into St. Pierre on May 11 with damaged engines, and on the 13th reported herself blockaded by "a powerful Spanish fleet, including fast destroyers." Receiving orders from Washington on the 15th, the Harvard sailed for Puertorico on the 17th. The Yale, after cruising off Puertorico, arrived at St. Thomas on May 13 and communicated with the St. Louis. As soon as the Spanish Squadron was reported off Curaçoa, another set of orders was issued, in the hope of obtaining touch with it while coaling, "probably under shelter of the peninsula of Paragana," in the Gulf of Venezuela. The idea was to despatch thither "three of the fast ships"—the St. Paul, expected to reach Key West on May 17, and "probably the Minneapolis and Harvard."† Nothing came of

Scouting.

* See page 142.
† Secretary of the Navy to Commander-in-Chief, May 16.

this plan, and Admiral Sampson was at the same time directing the St. Paul and Yale to scout between Morant Point, Jamaica, and Mole St. Nicholas, Haiti. On May 18, the St. Paul received orders from Washington to proceed to Cape Haitien, where she arrived on the 20th, picking up the Yale in the Bahama Channel. Here further orders were received directing the St. Paul and Yale to Santiago, where they arrived on the 21st, and were joined by the Harvard. On the 25th, the St. Paul captured the British collier Restormel, which with 2400 tons of coal, had been to San Juan, thence to Curaçoa, and missing the Spanish Squadron, had been directed to Santiago. It is a fair inference from the above that "there was no scheme of scouting thought out and adhered to," * and it is clear that, in other circumstances, the omission to provide and execute such a scheme might have had important results. The Spanish Squadron, however, was incapable of offensive operations, and was merely bent on obtaining the shelter of a Cuban port. The cables gave all the information that was really necessary.

Cable cutting. As early as April 6 the Secretary of the Navy informed Admiral Sampson that

> The Department hopes to be able to cut the cables off Santiago de Cuba, even if it has to employ a special cable vessel for this purpose.

There was also a project for cutting the cables off Havana and putting the ends on board ship, to which the admiral objected, pointing out that a vessel could not lie continuously off this port. On April 28, the Senior Naval Officer at Key West was directed "not to cut cables till further orders," but on April 30 a telegram was sent to Admiral Sampson stating, "You are authorised to cut cables south of Cuba," and efforts in this direction soon commenced. On May 11, two steam and two sailing launches from the Marblehead and Nashville were employed in an attempt to cut the cables off Cienfuegos. Two cables were discovered, but could not be cut under the rifle fire from the shore, which caused nine casualties. On the same day, the Eagle sought for the cable off Diego Perez Island, but failed to find it after running six lines across its supposed course. On May 16, boats from the St. Louis and Wampatuck discovered but failed to cut the Santiago-Jamaica cable, but on the following day the St. Louis hooked a cable in 500 fathoms at 2,600 yards from the Morro, and cut it after withdrawing slowly out of range. This was a venturesome exploit which would have been impossible if capable gunners had handled effective guns in the Santiago works. On the morning of May 19, the St. Louis and Wampatuck attempted to cut the French

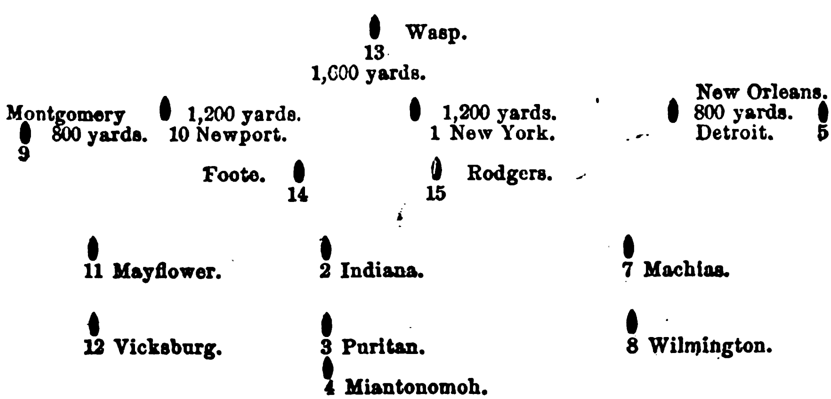
* Letter from an American officer to the writer.

cable running from Guantanamo to Haiti. The Wampatuck found the cable but failed to cut it, and withdrew under a fire to which her weak armament (3 3-prs. and 1 1-pr.) could not effectively reply. On the following day, the French cable was cut by the St. Louis off Mole St. Nicholas, Haiti. On May 22, attempts which failed were made to cut the cable west of Ponce, Puertorico. The St. Louis was handled with the greatest vigour and much daring on this service, and Admiral Sampson reported on July 19 that "every cable between Cuba on the south side was cut by Captain Goodrich." On the other hand, he pointed out that the specially-fitted Adria "did not cut a cable in a month's work," and that as the Spaniards had laid dummies it was "impossible to tell when a cable was cut." On July 10, the cable between Manzanillo and Santa Cruz was cut near the latter point by the Wampatuck. These operations show clearly that cable-cutting is not an easy operation even to a Power in absolute command of the sea, and they indicate that slight protection for the shore end of a cable is desirable. The Americans appear never to have succeeded in isolating Cuba; but, in the circumstances this was no disadvantage, and it may even be questioned whether the attempt was worth making. The existence of communication between Spain, Havana and Santiago was the direct cause of the sortie of Admiral Cervera and the destruction of his squadron * (Pl. IV.).

Tactical formations.

It resulted from the nature of the action of July 3 that no formation could be adopted by the American fleet, while the Spanish Squadron, intent only on escape, limited itself to steaming in the order in which it had been obliged to leave the harbour. On May 23, however, Admiral Sampson issued the following cruising and battle formations to his somewhat heterogeneous force.

CRUISING ORDER.



* See p. 151.

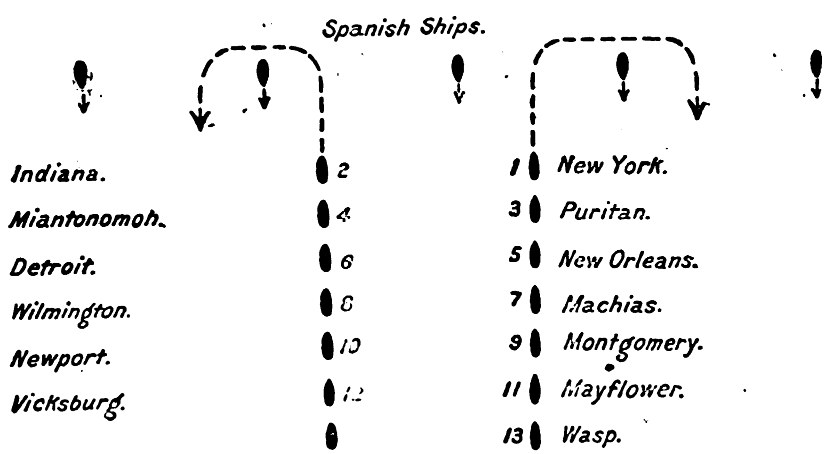
The first order of battle was a single column line ahead at two cables distance, thus:—

FIRST ORDER OF BATTLE.

1 New York, armoured cruiser.
2 Indiana, battleship.
3 Puritan, monitor.
4 Miantonomoh, monitor.
5 New Orleans, 3rd class cruiser, protected.
14 Foote, torpedo-boat.
6 Detroit, 2nd class cruiser, unprotected.
15 Rodgers, torpedo-boat.
7 Machias, gunboat.
8 Wilmington, gunboat.
9 Montgomery, 2nd class cruiser, unprotected.
10 Newport, gunboat.
11 Mayflower, armed cruiser.
12 Vicksburg, gunboat.
13 Wasp, yacht.

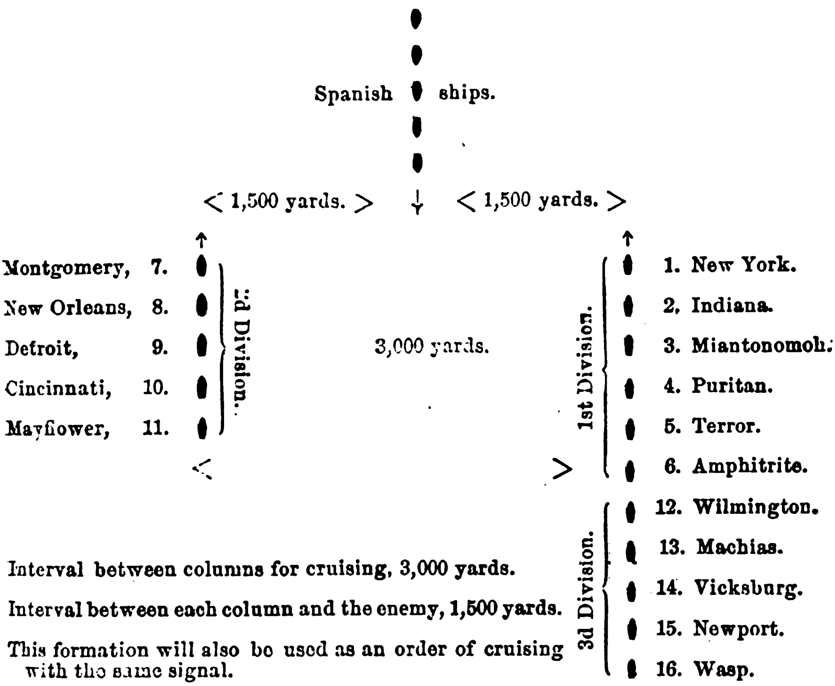
The second order of battle was intended to meet the extremely improbable case of finding the enemy advancing in line abreast. It was to be formed from the first "by the even-numbered ships, obliquing to the left until the interval between columns is sufficient to allow the columns to pass through the second and third intervals between the Spanish ships." After passing through these intervals, the ships were to turn outwards in succession, as shown below:—

SECOND ORDER OF BATTLE.



On May 24, a third order of battle was issued to meet the case of the enemy advancing in single column, line ahead:—

THIRD ORDER OF BATTLE



It is not easy to see how the second and third orders of battle could be employed effectively against an enemy possessing a decided superiority of speed, which was, nominally at least, the case of Cervera's squadron.

The auxiliary cruisers. The employment of the large auxiliary cruisers marks a new departure in war, and at the same time shows a curious reversion to ancient practice. Thus the St. Louis, of 17,000 tons displacement, was taken over with her officers and crew, who engaged to serve for the period of the hostilities. A captain of the U.S. Navy, with a young ensign as aide, and a marine officer with forty men were put on board. An armament of four 6-prs. was provided. The ship was ordinarily navigated by her own captain, and no change was made in the routine. Only during the risky operations involved in cable-cutting did the naval officer assume direct command. The conditions were practically those of Armada days, and "the results," states Captain Goodrich, U.S.N., "were most satisfactory. A happier or

more efficient vessel never went to sea." In the boat work under fire at Guantanamo on May 19, the crew of the St. Louis took part, and Chief Officer T. J. Segrave received special commendation. Vessels of this class, which carry 200 lb. of steam in cylinders 14 feet above the water-line, are clearly unsuited for regular fighting purposes, but their great speed and sea-keeping qualities render them admirably adapted for scouting with a fleet, and the arrangement by which officers and men became available for the service of the State without dislocating the ordinary routine, seems specially advantageous. The St. Louis went to sea with one quarter of her displacement in coal, and for six weeks never took on board any coal, water, or provisions. The publicists who have dwelt on the injury to Great Britain, due to the abandonment of privateering, may perhaps be induced to reconsider their position. For operations against commerce, such vessels as the St. Louis and St. Paul in capable hands, are necessarily formidable. The advantages of maintaining crews of British nationality on our registered auxiliary steamers are evident. While the St. Louis came under fire off Santiago, and escaped without injury, owing to the hopeless gunnery of the Spaniards, the St. Paul, which carried six 5-in., six 6-pr. and six 3-pr. guns, engaged the destroyer Terror on June 19 off San Juan. When the Terror attacked, the St. Paul "held her position practically without headway, head to the eastward," * and opened fire at 5,400 yards. The Terror was hit by a single 5-in. shell, which struck the starboard side amidships, passed through the hull without bursting, wrecked the intermediate cylinder of the starboard engine, killing two engineer officers, and emerged below water on the port side, creating a serious leak. The extreme vulnerability of these craft was thus well illustrated. The Terror, whose 12-prs. had been left at Martinique, was put out of action by a single hit, and nearly sunk before approaching to a range at which her 6-prs. could reach the St. Paul.

Coaling. The coaling arrangements made by the Navy department were extensive, and "notwithstanding the many difficulties which developed, there was at no time any complaint of lack of coal." * For service in the Atlantic, fifteen steamers with an aggregate coal-carrying capacity of 46,000 tons were purchased. Two others with a capacity of 9000 tons were bought for use in the Pacific. The nominal speed of these steamers varied from 9 to 14½ knots, and each received an armament of two or four 6-pr. or 3-pr. guns "for repelling attack from privateers." † The amount of coal

* Report of Captain C. D. Sigsbee, U.S.N.
† Report of the Secretary of the Navy.

purchased in the fiscal year ending June 30, 1898, exceeded that of the previous year by 314,000 tons.* This figure, therefore, represents approximately the requirements of the war up to the middle of 1898. Key West was the coaling station of the force in West Indian waters, until the occupation of Guantanamo Bay provided an excellent temporary base for the southern blockade. At Key West the heavy ships practically coaled at sea, and it was found that when using lighters the work could be carried on in comparatively rough water. Coaling from colliers at sea was at times resorted to, but proved precarious. The purchased steamers were not all well adapted for rapidly coaling the warships, and the need of specially designed colliers was manifested. It was also clear that with well adapted colliers, a fleet in command of the sea can largely dispense with regular coaling stations, the value of which has been somewhat exaggerated in this country.

Miscellaneous requirements.

One of the greatest needs was that of a sufficiency of fresh water, the want of which caused much injury to the boilers of the ships, and reduced the fleet to a state which might have proved serious in less fortunate conditions. The New York was self-supplying in this respect, and her boilers gave no trouble. In other ships the expedient of running a pipe from a spare boiler to the main condenser was tried with success. The steamers Iris (6000 tons), Niagara (5220 tons), and Rainbow (6200 tons), were specially fitted as condensing ships, but were not ready for use during the war. The Iris carried 2475 tons of coal, and was estimated to produce 60,000 gallons of water per day. Three supply-ships were in constant employ, and an ice-boat as well as a special refrigerating vessel were put in requisition. Hospital needs were fulfilled by the Solace, of 4700 tons, fitted out for the accommodation of 200 patients, and equipped with every medical convenience; but the total number of wounded was only fifty-eight, and the average number of sick only 2½ per cent.† The health of the American Navy throughout the war was surprisingly good, and even in the marine battalion of 600 men camped on shore the sickness was insignificant. This is a striking tribute to the knowledge and forethought of the naval administration, as well as to the careful supervision of the executive officers. For the purpose of repairs the Vulcan, of 3500 tons, fitted out as a workshop carrying skilled mechanics, was sent to Guantanamo, and proved invaluable. "It would have been better to have had a considerably larger ship," ‡ since "the long list of waiters for repairs or over-

* The total naval charges arising out of the war slightly exceeded seven millions sterling.

† The total naval losses in the war amounted to 16 killed and 68 wounded.

‡ Captain Chadwick, U.S.N.

hauling was sometimes heart-breaking," although the larger warships gave all the aid possible. From one cause or another "a full third of the force . . . had at all times to be counted off as unavailable."

Conclusions. The issues of the war were determined absolutely by the naval conditions, as must always be the case where the sea divides the territories of two belligerents. The miserable inefficiency of the Spanish Navy rendered resistance hopeless from the first, and the despatch of Admiral Cervera's ill-equipped and ill-trained squadron to the West Indies simplified the situation to the Americans and precipitated the final result. If Cuba had been left to its own resources the defence would probably have been prolonged. The fall of the remote and ill-defended position of Santiago practically proved decisive, and the attack of Havana was thus avoided. Great questions of naval strategy can hardly be said to have arisen; but the war is none the less instructive. The possibilities open to an inferior fleet, provided that it is an effective fighting force, were at least indicated. The initial proceedings of the United States were based on the supposition that the Spanish Fleet was a reality. Thus no attempt to send an invading force to sea was made until all naval menace was absolutely removed, although Cuba lies at the doors of the United States and is 4000 miles from Cadiz. And when at length the only hostile naval force in West Indian waters was securely bottled in Santiago, the mere improbable rumour of the appearance of a Spanish cruiser off the north side of Cuba sufficed to prevent the sailing of the force from Tampa for six days. No more effusive tribute to sea-power was ever offered; but, on the hypothesis adopted by the Strategy Board, who will say that this tribute was not justified? Clearly, if Cervera's squadron had been what it pretended to be, and if Puertorico, Santiago, Cienfuegos, and Havana had possessed the minimum of effective coast defence combined with the means of rapidly coaling and supplying a fleet, a complicated naval war game might have been played, which for a time would have effectually prevented any invasion of Cuba.

Coast defences. Captain Mahan has laid great stress on the paralysing effect of inadequate coast defences, but the lesson of the war is of an opposite character. Judged by any modern standard, the coast defences of Cuba were miserable; but a moderately effective fleet based upon Cuban ports would have found them ample, and they may actually be said to have served their purpose. The term "coast defence" in relation to a naval power is commonly abused and misunderstood. Ports containing essential naval resources, or serving as the bases of a commercial marine require small permanent defences sufficient to prevent a naval raid. How small these defences may be Santiago

shows. Half a dozen 6-in. Q.-F. guns well mounted and well handled would have fulfilled every requirement. Towns situated on a long sea-board must take their chance. Even a superior navy acting at a great distance from its base will find no profit in expending ammunition upon them. An inferior navy will certainly leave them severely alone. It is surely easier and infinitely cheaper to educate public opinion than to embark upon the vast schemes which coast defence in any other sense entails. Whether it was realised at the time that the Santiago batteries were roughly extemporised structures mounting only four effective guns, and lacking every essential of a coast-defence work, cannot be stated. The total number of rounds expended upon these structures must have been large; but the gunnery practice thus obtained was doubtless valuable.

General Remarks.

It is peculiarly interesting to note that popular clamour in the United States, while ridiculously exaggerating the dangers of the sea-board, was reckless in demanding military operations in Cuba before the naval situation was secure. Sea power was thus extravagantly feared where it is weakest, and ignored where it is obviously strongest. At the same time the Press and the people of the United States showed a marked tendency to under-rate the military difficulties of operations in Cuba. National experience of such operations over-sea was wanting; but history abounds in lessons easily forgotten. The naval department at Washington rose to the occasion; the military department showed great shortcomings which have since been the subject of much recrimination. The expeditionary force despatched to Santiago was deficient in essential respects having regard to the task to which it was committed. If Admiral Sampson's original proposal had been carried out, the want of artillery and the defects of equipment would have been less serious. The direct attack on the town of Santiago threw a heavy strain upon the troops. The successful assertion of sea-power usually requires to be followed up by the employment of military force, and the rapid despatch of a well-equipped expedition may lead to striking results. This, the plain teaching of our long history, is too little realised. The technical lessons of the war may be gathered from the above pages, and it will be noted that some of the questions which are eagerly debated in time of peace proved relatively unimportant. In war, the human factor, using the term in the broadest sense, asserts itself, now as always, and matters which fail to attract academic discussion at once spring into prominence.

In regard to naval construction, it may fairly be said that the extreme value of sea-going and sea-keeping qualities was abundantly

manifested. The monitors, endeared to American sentiment by a certain memorable action in Hampton Roads, proved desperate failures. The torpedo-boat, of which much has been written, displayed only its limitations. To ignore the torpedo-boat would be folly; but there is not the smallest reason to expect that the operations of naval war will be sensibly affected by its agency.

During the Civil War, the President and the Secretary of the Navy received frequent and urgent appeals from the governors and citizens of sea-board states for naval protection. The following is a typical telegram of the time:—

BOSTON, 2.40 p.m., Feb. 2, 1863.

From last reports concerning the Alabama, the intelligent Boston merchants believe that it is not improbable that Semmes may make a descent, say at Provincetown, which is wholly unprotected, and suggest that an armed Federal vessel should be stationed there.

JNO. A. ANDREWS,
Governor of Massachusetts.

Such appeals were as a rule most wisely disregarded. Writing in 1897, Captain C. F. Goodrich, U.S.N., significantly states*:—

"Whether, in the event of war in these days, a Secretary of the Navy can possibly be as independent in his actions as was Mr. Welles, it is difficult to say. The question is of great importance to us, although it hangs rather upon the sociological developments of the country than upon naval policy. Personally, I am disposed to fear that the powers of the Press and the politician will, together, overbear the future Secretary and force him into abandoning not the true faith itself, but its practice.

The fear thus expressed was prophetic. In April, 1898, the naval authorities had a plan of operations carefully matured. "The Press and the politician" supervened, with the natural result that the plan disappeared, and the initial naval proceedings took the form of a compromise strategically indefensible. The incompetence of the Spanish Navy was so complete that this sacrifice of principles to popular clamour proved quite unimportant. In less fortunate circumstances it might have been disastrous. War, whether by sea or land, is a game that can be effectively played only by experts acting in accordance with great principles. In free countries, where the views of sailors and of soldiers are always liable to be regarded with suspicion, there is a real danger that the direction of warlike operations may be warped by an uninstructed popular outcry. This, to the United States and to ourselves, is perhaps the greatest lesson of the recent war.

In conclusion, I desire to acknowledge warmly the assistance received from Captain F. E. Chadwick, U.S.N., Captain C. F. Goodrich, U.S.N., and Commander J. S. Colwell, U.S.N., who have most kindly supplied me with valuable information.

G. S. CLARKE.

* "Naval Raids," Proc. U.S. Naval Institute.

CHAPTER VI.

Recent Warship Construction.

The time has arrived when it seems desirable to again review and compare the principal battleships and cruisers under construction for the British and Foreign Navies, which have been described in this or preceding numbers of the *Naval Annual.*

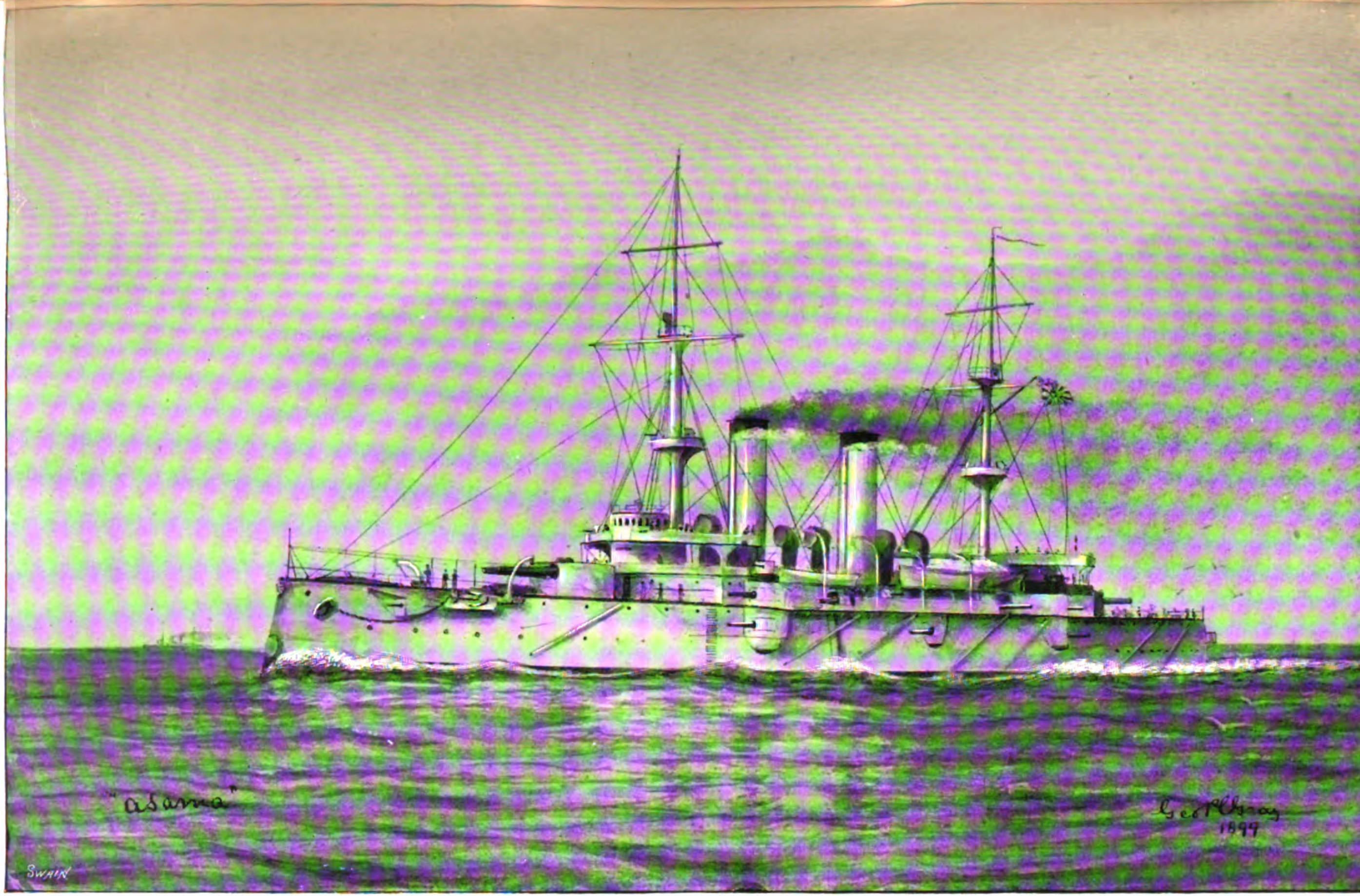
While it is scarcely necessary to again call attention to the remarkable extent to which the British type of battleship has been copied in foreign navies, it is interesting to note illustrations marking the stages of this process. For example,* the Russian Navy ten years ago is represented by the Nicolai I., with a broad 14-in. complete belt, and scarcely any other armour beyond a 10-in. turret and four 6-in. shielded positions for her 9-in. guns, her broadside 6-in. guns and the rest of her hull being unprotected. Five years later the Tria Sviatitelia had a disposition of armour roughly resembling the Trafalgar, that is to say, she had an 18-in. belt of about corresponding length, turrets with no unprotected hull beneath them, and armour carried upwards from the belt to cover the broadside Q.-F. guns. Another five years sees Russia ordering the Retwizan at Cramp's yard, with the curved armoured deck and casemates, as well as the comparatively thin belt of face-hardened armour that Sir W. White introduced first in the Majestic class. **Recent types.**

In the Japanese Navy, British designs have been closely followed in the powerful battleships recently constructed or under construction. The Fuji and Yashima are almost exact reproductions of the Royal Sovereign type. The Shikishima and her sisters, in the distribution of armour and armament at any rate, may be said to belong to the Majestic class.

In the United States Navy, the Iowa, launched in 1896, had a belt of limited length and two gun-turrets, but the armour was not continued above the belt, and the grouping of the secondary armament resembled that of French designs rather than British. In the Kearsarge and later types, still building, the British practice has been followed of covering the side, up to the main deck, with 5-in. armour. In the Alabama, subsequently designed, the grouping of

* All the examples are taken from plates in the *Annual.*

—	Formidable.	Duncan.	Iéna.	Kaiser Friedrich III.	Petropavlovsk.	Benedetto Brin.	Maine.	Shikishima.
Displacement	15,000	14,000	11,870	11,130	10,960	12,564	12,500	14,850
Length	400 ft.	405 ft.	400 ft. 9 in.	377 ft.	367 ft. 6 in.	413 ft. 5 in.	388 ft.	400 ft.
Beam	75 ft.	75 ft. 6 in.	68 ft.	67 ft.	69 ft.	78 ft.	72 ft. 3 in.	75 ft. 6 in.
Draught	26 ft. 9 in.	26 ft. 6 in.	27 ft. 6 in.	25 ft. 8 in.	26 ft.	27 ft.	24 ft. 6 in.	27 ft. 3 in.
Speed	18	19	18	18	17·5	20	18	18·5
I.H.P.	15,000	18,000	15,500	13,000	10,600	18,000	16,000	14,500
Armour—								
Belt.	9 in.	7–4 in.	13¾ in.	11¾ in.	15¾ in.	6 in.	12–8½ in.	9–4 in.
Side.	9 in.	7–4 in.	4¾–3 in.	..	..	6 in.	7 in.	6 in.
Main gun position .	12 in.	10–7 in.	..	9¾ in.	10 in.	9¾ in.	12–11 in.	14 in.
Secondary „ . .	6 in.	6 in.	..	6 in.	6 in.	6 in.?	5 in.	6 in.
Deck	2–3 in.	?	2½ in.	3 in.	3½ in.	3 in.	2¾–4 in.	3–5 in.
Coal supply—								
Normal	900	900	820	700	900	1000	1000	700
Full bunkers . . .	2000	2000	1100	1000	..	2000	2000	1400



"ASAMA,"

JAPANESE ARMOURED CRUISER.

the armament is British, for the multiplication of gun positions and top-heavy structure has ceased.

France has adopted the British system of distribution for the main armament in two-gun positions instead of four, but in spite of having found it necessary to remove military masts and upper structure, which experiments had proved to be top heavy and dangerous, still retains much that is French in the grouping of her secondary guns, and in her willingness to purchase her heavy complete belt by the loss of protection all over her hull, and especially beneath her gun positions. Germany, to a great extent, has copied French designs in her Kaiser Friedrich III. class.

The Italian battleships of most recent design are a type by themselves, and are remarkable for the large amount of side covered with armour—a great contrast to the Sardegna or Lepanto class, which, in point of protection, are little more than armoured cruisers.

Fire energies.

The table on the opposite page gives the leading features of the battleships it is proposed to consider, while in the table on the next page are given the fire energies, which are necessarily very rough approximations, as they are estimated on uncertain or unknown elements in many cases. Nevertheless, a guess may be made which may enable a definite idea to be formed as to ships' probable fire energy in action. The rates are based on those obtained at sea either by the Excellent or in Elswick sea trials, modified to some extent by practical considerations. As to velocity, the highest given are some between 2600 and 2700 f.s., taken from Elswick and Krupp tables. Very high velocities fall so rapidly that it would be delusive to employ them. In cases of ignorance (especially with Russian guns) for ships *building*, British guns are substituted, as much more nearly representing the ships' future armament than guns taken from any published Russian table. It should be borne in mind that these figures only deal with one fighting element, and that from one point of view. British ships and others with great *defensive* powers are placed at a great disadvantage in this comparison.

British battleships.

The British battleships built during the last ten years may be said to belong generally to the type first introduced in the Royal Sovereign. Improvements in the quality of armour have enabled the thickness to be diminished and the area of protection to be increased. All the secondary armament in battleships built since the Royal Sovereign is mounted in armoured casemates. The horse-power has been increased from 13,000 in the Royal Sovereign and 12,000 in the Majestic, to 15,000 in the Formidable and 18,000 in the Duncan class. Speed has risen from 17½ knots to 18 knots in the Formidable and 19 knots in the new ships. The displacement of the British battleships is as a

FIRE ENERGY PER MINUTE.

BATTLESHIPS.

FORMIDABLE (15,000 tons).

Armament.	Energy per gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
4 12-in. IX.	39,850	3 in 4 min.	119,550
12 6-in. Q.F.	4,840	16 in 3 min.	309,760
18 12-prs.	423	10 per min.	76,140
12 3-prs.	80·3	10 per min.	9,636
			515,086

515,086 Foot Tons.
34·34 per Ton Displacement.

DUNCAN (14,000 tons).

Armament.	Energy per gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
4 12-in. IX.	39,850	3 in 4 min.	119,550
12 6-in. Q.F.	4,840	16 in 3 min.	309,760
12 12-prs.	423	10 per min.	50,760
12 3-prs.	80·3	10 per min.	9,636
			489,706

489,706 Foot Tons.
34·98 per Ton Displacement.

IÉNA (12,052 tons).

Armament.	Energy per gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
4 12-in.	30,750	3 in 4 min.	92,250
8 6·4-in. Q.F. (16 c.m.)	4,730	16 in 3 min.	201,813
8 3·9-in. Q.F. (10 c.m.)	1,475	10 per min.	118,000
16 1·8-in. (47 m.m.)	121	10 per min.	19,360
			431,423

431,423 Foot Tons.
35·73 per Ton Displacement.

KAISER FRIEDRICH III. (10,954 tons).

Armament.	Energy per gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
4 24 c.m. Q.F. (9·4-in.)	19,905	1 per min.	79,620
18 15 c.m. Q.F. (5·9-in.)	4,213	16 in 3 min.	404,448
12 8·4 c.m. Q.F. (3·3-in.)	771	10 per min.	92,520
			576,588

576,588 Foot Tons.
52·64 per Ton Displacement.

BENEDETTO BRIN (12,564 tons).

Armament.	Energy per gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
4 12-in.	39,850	3 in 4 min.	119,550
4 8-in. Q.F.	10,662	3 per min.	129,144
12 6-in. Q.F.	4,840	16 in 3 min.	309,760
10 12-prs.	423	10 per min.	42,300
			600,754

600,754 Foot Tons.
47·83 per Ton Displacement.

PETROPAVLOVSK (10,960 tons).

Armament.	Energy per gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
4 12-in.	33,020	3 in 4 min.	99,060
12 5·9-in. Q.F.	4,840	16 in 3 min.	309,760
34 small Q.F. taken as 12 and 3-prs.	(average 251·7)	10 per min.	85,578
			494,398

494,398 Foot Tons.
45·10 per Ton Displacement.

MAINE (12,500 tons).

Armament.	Energy per gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
4 12-in.	25,985	3 in 4 min.	77,955
16 6-in. Q.F.	3,200	16 in 3 min.	273,067
20 6-prs.	279·5	10 per min.	27,950
			378,972

Should the Maine receive 12-in. guns and 6-in. Q.F. equal to British, her energy per min. would become 560,513 ft.-tons.

378,972 Foot Tons.
22·32 per Ton Displacement.

SHIKISHIMA (14,850 tons).

Armament.	Energy per gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
4 12-in.	39,850	3 in 4 min.	119,550
14 6-in. Q.F.	4,840	16 in 3 min.	361,387
20 12-prs.	423	10 per min.	84,600
			565,537

565,537 Foot Tons.
38·07 per Ton Displacement.

rule considerably greater than that of battleships building for foreign navies, with the exception of the Shikishima class. The large displacement is to some extent accounted for by the greater quantity of coal carried in British as compared with foreign battleships. In sea-going qualities it is clear that British battleships are unsurpassed, though there seems no reason to suppose that the foreign battleships with which we are here comparing them are lacking in this respect. The protection for the vitals of British ships seems adequate, though the belt armour of the French, German, Russian, and United States battleships is considerably thicker (12 in. in the Kaiser Friedrich III. to 16½ in. in the Alabama class). In the latest British battleships, including the Canopus and the Formidable classes, the bow is covered with 2-in. armour from the citadel to the stem, thus to some extent obviating the necessity for the forward armoured bulkhead. The form and thickness of protection for the main armament are approximately the same in all cases. For the secondary armament the system of casemate protection in the Japanese and British battleships has not been universally adopted in other navies. The French, Russians, and Germans often use turrets in which the guns are sometimes mounted in pairs. The Italians and the Americans prefer a battery. A glance at the diagram of energy of fire will show that British battleships do not compare unfavourably with those of foreign navies. In speed there is little to choose between the Formidable class and the German and French ships. The 19-knot speed of the new British ships is superior to that of anything building abroad, except the Italian battleships.

French battleships.

Turning to the French ships, it was pointed out in the *Naval Annual* for 1897 that the Charlemagne and similar ships, where the hull has been left exposed for the sake of the water-line belt, are open to destruction in every form by common 6-in. shells, and might, with the exception of the belt-protected part and the turret guns, be reduced to a floating ruin. "V. G.," writing in *Le Yacht*, confirms that opinion, and considers that French battleships are too much exposed to the risk of capsizing from an injury at the upper edge of the belt, which would admit water on to the protective deck. The secondary armament of the Charlemagne is only protected by 3-in. armour. Between the belt and the upper deck, on which the secondary armament is mounted, there is only a narrow strip of 3-in. armour above the belt. "L'Iéna," says *Le Yacht*, "représente une unité de combat puissante. Nous lui ferons le reproche d'avoir, comme le Charlemagne, ses réduits pour canons de 164mm. (6·4 in.) insuffisamment soutenus à la base et exposés à de grosses avaries du fait de projectiles à la mélinite éclatant

endessous de leur plancher. Nous préférons le système à tourelles du Masséna, ou tout au moins le système mixte, avec réduit blindé depuis la base comme sur le Brennus. On a qualifié, avec peut-être une légère exagération, les logements des canons moyens du Charlemagne et de l'Iéna, de casemates aériennes. Cette épithète fait néanmoins bien ressortir leur défaut." In the Iéna the side is to be covered with $4\frac{3}{4}$ to 3-in. armour above the belt to the height of the main deck. In spite of its improved quality, this armour is not thick enough to exclude projectiles from 6-in. guns, and therefore does not altogether remove the objection which we are urging to the designs of French battleships. The difference in resisting power between 6-in. and 3-in. plates is enormous. Were they of the same steel it would be proportional to the squares of their thicknesses, that is, as 36 to 9 or 4 to 1. But the steel is not the same, for hitherto it has been found impracticable to harden the face of a plate thinner than 5 in., or, at all events, 4 in., owing to liability to contortion in the hardening process. Consequently up to the present time all armour thinner than 4 in. or even 5 in. may be assumed to be unhardened, and a 6-in. Harveyed plate is more than nine times as good as any 3-in. plate. This tells specially, because the former may be depended on to keep out all quick-firing projectiles, whereas the latter may be perforated, not only by 6-in. shot, but even 6-in. armour-piercing shells, under most conditions of battle.

Friedrich III. class.

The Kaiser Friedrich III. labours under the same disadvantages as recent French battleships. There is little armour on the side above the belt, and many of the secondary guns are liable to be put out of action by shells exploding beneath the floor of the turret or casemate in which they are mounted. The secondary armament is exceedingly powerful, and comprises eighteen 6-in. guns as compared with fourteen in the Alabama and Shikishima, and twelve in the British and Russian ships. It is probably as well distributed as it can be, but there would appear to be some danger of interference of fire, especially of the forward 6-in. guns, mounted immediately below the muzzles of the 9·4-in. guns. While most navies have adopted a gun of 12-in. calibre for the main armament, the Germans have contented themselves with 9·4-in. so-called Q.-F. guns. For the reasons above given the energy of fire per ton of displacement is very high in the Friedrich III. and her five sisters, now under construction or projected for the German navy.

Petropavlovsk.

A glance at the illustration and plate 74 of the Petropavlovsk will show that the method of mounting and distribution of the 6-in. armament is somewhat original. It does not seem open to much objection. Four 6-in. guns are mounted amidships on the main deck,

and eight 6-in. guns in pairs in turrets on the upper deck. The Petropavlovsk, like the French and German ships, has too small an area of side protected by armour.

Italian ships.

The Benedetto Brin is protected by a belt 6 in. thick between the turrets, tapering to 2 in. at the ends of the ship. In accordance with the ideas adopted in recent battleship and cruiser construction in Italy, the whole side, including the battery for the secondary armament, is covered with 6-in. armour from turret to turret, and from the belt upwards. The ends of the central redoubt are closed by 10-in. transverse bulkheads. The armament of the Benedetto Brin is very powerful. In addition to the armament of British battleships, she carries four 8-in. Q.-F. guns. Her speed (20 knots) is superior to that of any battleship built or building, and her coal-supply is good.

United States ships.

In the Alabama and Maine classes,* the superimposed turrets, which have been generally condemned in the Kearsarge, have been abandoned. The Alabama is described at length at p. 111. The Americans have adopted the same system of protection for their secondary armaments as the Italians. The whole side of the vessel above the belt, between the turrets, is covered by 5½ in. of steel in the case of the Alabama, 7 in. in the case of the Maine, with 1½-in. steel splinter-bulkheads between each 6-in. gun, thus confining any injury to its own compartment. The speed of the Maine is 18 knots, as compared with 16½ knots in the Alabama. She is as well protected as any battleship, carries a very powerful armament, and is in all respects a most powerful ship.

Redoubts v. casemates.

Recent experience, especially that of Santiago, seems to show that medium hard-faced armour, spread over a large area of the ship's side, is the best system of protection, both for the hull and for the secondary armament. Provided the guns of the latter are isolated by screens, it is perhaps preferable to the system of casemate protection, which, while giving better protection in front to each gun, allows the gun to be put out of action from the rear by medium or even small projectiles entering on the opposite side of the ship, and which also allows the whole ship between the casemates to be wrecked, as were the Spanish cruisers at Santiago, by the fire of even the smallest quick-firers. On the other hand, a single 12-in. armour-piercing shell entering the battery of such a ship as the Colon, might do an amount of mischief to which the casemates are not liable. The latter have some advantage in being less liable to the poisonous effects of the bursting charge of high explosives than a gun position protected by traverses. Under present conditions, it is hardly likely that such a shell could enter. An armour-piercing shell might enter the battery,

* *Cf.* plates.

but hitherto has not been allowed to be charged with high explosives because its base has to have an opening and fuse in it.

Value of medium armour. The Colon furnishes an excellent example of the value of medium hard-faced armour. It is probable that her captain by no means appreciated her powers. Without her primary guns, he may have considered her terribly defective, and only differing in degree from her consorts. Yet, while deprived of the power of making "belt attack," her powerful 6-in. Q.-F. batteries might have enabled her to cripple the Brooklyn had she closed and delivered her fire into her, while, except at her ends, her own protection was complete against all but the Brooklyn's slow-fire primary 8-in. guns, and these could only injure her with armour-piercing projectiles, and then would only get a little dead metal through. 6-in. Harveyed armour is equivalent to 12 in. of iron if struck direct, and at an angle soon runs up to 16 in., even before the direction appears to be decidedly oblique. This is dwelt on because it affects battleships and cruisers alike, especially those of England, which carry 6-in. Harveyed armour largely on their upper structure. It is necessary to point out that, while the Colon escaped with less fire than the others, by some curious carelessness it seems generally forgotten that the eight hits recorded on her are found on the portion above water and open to examination, that is to say, about half of her side. Among the hits is one of a 5-in. armour-piercing projectile, defeated, as it was certain to be, by her 6-in. armour. Altogether it cannot be doubted that in the future belt armour will be thinner, as it already is in British designs, and hard-faced Krupp plates, which are still better than Harveyed, will be used as far as possible in the hulls of armoured ships of all classes.

Turning to cruisers, the table on the opposite page brings together the leading features of the principal types.

British cruisers. If in the battleship classes other navies have followed our lead, in the Cressy class we have followed the example of the Russian and other navies by adopting the belt for the protection of the vitals of the ship, instead of depending, as we have done hitherto, on a protective deck. The armament of the Cressy class is the same as that of the Powerful, and includes two 9·2-in. guns, in place of the four 6-in. Q.-F., mounted on the poop and forecastle, as in the Diadem class. In energy of fire per minute, the armament of the Cressy is inferior to that of the Elswick built ships Asama and O'Higgins, far inferior to that of the Gromoboi, which is about the same size, and of the Francesco Ferrucio, which is little more than half the displacement, and is only superior to that of the new French cruisers. The 6-in. guns are mounted in casemates and distributed

—	Cressy.	Drake Class.	Dupetit-Thouars.	Desaix.	Gromodoi.	G. Garibaldi.	Asama.	O'Higgins.	Fürst Bismarck.
Displacement . . .	12,000 tons	14,200 tons	9367 tons	7575 tons	12,336 tons	7282 tons	9750 tons	8500 tons	10,482 tons
Length	444 ft.	500 ft.	452 ft. 9 in.	426 ft. 6 in.	473 ft.	344 ft. 6 in.	408 ft.	411 ft. 9 in.	393 ft. 8 in.
Beam	69 ft. 6 in.	71 ft.	63 ft. 8 in.	58 ft. 4 in.	68 ft. 6 in.	59 ft.	67 ft.	62 ft. 6 in.	66 ft. 9 in.
Draught	26 ft. 3 in.	26 ft.	24 ft. 7 in.	24 ft. 4 in.	26 ft.	23 ft. 9 in.	24 ft. 3 in.	22 ft.	26 ft.
Speed	21 knots	23 knots	21 knots	21 knots	..	20 knots	22 knots	22 knots	19 knots
I.H.P.	21,000	30,000	19,600	17,100	..	14,000	18,000	16,000	14,000
Armour—									
Belt	6 in.	6 in. (?)	6 in.	4 in.	6 in.	6 in.	7 in. to 3½ in.	7 in. to 5 in.	7¾ in.
Gun-positions . .	6 in.	6 in. (?)	..	3¾ in.	..	6 in.	6 in.	6 in.	7¾ in.
Deck	3 to 2 in.	4 to 2 in.	2 in.	2¾ in.	..	1½ in.	2 in.	2 in.	3 in.
Coal capacity—									
Normal	800 tons	1250	1020 tons	880 tons	..	655 tons	600 tons	..	1000 tons
Full bunkers . .	1500 tons	2500	1600 tons	1200 tons	..	1000 tons (?)	1400 tons	1200 tons	..
Cost	£723,000	£	£305,000	£620,000	£	£520,000	£	£	£

FIRE ENERGY PER MINUTE.

CRUISERS.

CRESSY (12,000 tons).

Armament.	Energy per Gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
2 9·2-in. . . .	17,810	1 per min.	35,620
12 6-in. Q.F. . .	4,840	16 in 3 min.	309,760
17 small Q.F. taken as 12 and 3-prs.	average 251·9	10 per min.	42,789
			388,169

388,169 Foot Tons.
32·35 per Ton Displacement.

NEW POWERFUL (14,200 tons).

Armament.	Energy per Gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
2 9·2-in. . . .	17,810	1 per min.	35,620
12 6-in. Q.F. . .	4,840	16 in 3 min.	309,760
16 12-prs. Q.F. .	423	10 per min.	67,680
12 3-prs. Q.F. .	89·3	10 per min.	9,636
			422,696

422,696 Foot Tons.
29·77 per Ton Displacement.

DUPETIT-THOUARS (9,367 tons).

Armament.	Energy per Gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
2 19·4-cm. . . (7·6 in.)	7,898	3 in 2 min.	23,694
8 16·47-cm. Q.F.. (6·48-in.)	4,730	5 per min.	189,200
4 10-cm. Q.F. . (3·9 in.)	1,475	7 per min.	41,300
16 47-mm. Q.F. . (1·8-in.)	121	10 per min.	19,360
6 1·4-in.			
			273,554

273,554 Foot Tons.
29·21 per Ton Displacement.

FÜRST BISMARCK (10,482 tons).

Armament.	Energy per Gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
2·4-cm. Q.F. . (9·4-in.)	19,905	1 per min.	79,620
12 15-cm. Q.F. . (5·9-in.)	4,213	16 in 3 min.	269,632
10 8·7-cm. Q.F. . (3·4-in.)	857	10 per min.	85,700
			434,952

434,952 Foot Tons.
41·52 per Ton Displacement.

FRANCESCO FERRUCIO (7282 tons).

Armament.	Energy per Gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
1 10-in. . . .	14,430	3 in 4 min.	10,598
2 8-in. Q.F. . .	10,662	3 per min.	63,972
14 6-in. Q.F. . .	4,840	16 in 3 min.	361,387
10 2·9-in. Q.F. .	419·5	10 per min.	41,950
6 1·8-in. Q.F. .	80·3	10 per min.	8,030
			485,937

485,937 Foot Tons.
62·16 per Ton Displacement.

DESAIX (7,578 tons).

Armament.	Energy per Gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
10 16·47-cm. Q.F. (6·4-in.)	4,730	5 per min.	236,500
10 47-mm. Q.F. . (1·8-in.)	121	10 per min.	12,100
			248,600

248,600 Foot Tons.
32·81 per Ton Displacement.

GROMOBOI (12,336 tons).

Armament.	Energy per Gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
4 8-in. Q.F. . .	10,662	3 per min.	127,944
16 6-in Q.F. . .	4,840	16 in 3 min.	413,013
6 4·7-in. Q.F.. .	1,491	6 per min.	53,676
14 3-in. Q.F. . .	423	10 per min.	59,220
20 1·8-in. Q.F. .	80·3	10 per min.	16,060
			669,913

669,913 Foot Tons.
54·29 per Ton Displacement.

ALMIRANTE O'HIGGINS (8,500 tons).

Armament.	Energy per Gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
4 8-in. Q.F. . .	10,662	3 per min.	127,944
10 6-in. Q.F. . .	4,840	16 in 3 min.	258,133
4 4·7-in. Q.F.. .	1,491	6 per min.	35,784
10 12-prs. . .	423	10 per min.	42,300
10 6-prs. . . .	279·5	10 per min.	27,950
			492,111

492,111 Foot Tons.
57·90 per Ton Displacement.

ASAMA (9750 tons).

Armament.	Energy per Gun. Ft.-tons.	Rate of Fire.	Total Energies. Ft.-tons.
4 8-in. Q.F. . .	10,662	3 per min.	127,944
14 6-in. Q.F. . .	4,840	16 in 3 min.	361,387
12 12-prs. . .	423	10 per min.	50,760
7 2½-prs. . . .	70	10 per min.	4,900
			544,991

544,991 Foot Tons.
55·90 per Ton Displacement.

"ALMIRANTE O'HIGGINS,"
CHILIAN ARMOURED CRUISER.

in the same way as in the Diadem and the Powerful. The speed of the Cressy is equal to that of the new French cruisers, superior to that of the Italian and German cruisers, but inferior to that of the Asama and O'Higgins. "V. G.," writing in *Le Yacht*, considers that the Cressy class could take their place in the fighting line alongside the Canopus, and that "les croiseurs cuirassés anglais de 23 nœuds, aussi bien que ceux de la classe Cressy, sont plutôt construits pour combattre et détruire nos propres croiseurs cuirassés que pour servir d'éclaireurs d'escadres." The new Powerful will have a speed of 23 knots, which is equal to that of the Jeanne d'Arc, the French * and American † commerce-destroyers, and of the second-class cruisers, such as the Buenos Ayres and Yoshino, for the construction of which the Elswick firm is so famous. We can only repeat here that we object to such an enormous displacement for a cruiser.

French cruisers. Turning to the French cruisers, the Dupetit-Thouars class is protected by a complete water-line belt of a maximum thickness of 6 in. at the upper edge only, tapering to 3·8 in. at lower edge amidships, and to 2·9 in. forward. For the reasons given when discussing French battleships, this protection is hardly thick enough to be really effective, and in the Condé, Sully, and Gloire—which are of the same class improved—the increase in displacement of 500 tons has been mainly devoted to giving better protection. The armament of these cruisers is considerably weaker in proportion to their size than that of other cruisers in the list, with the exception of the new Powerfuls, but it is well distributed. *Le Yacht* strongly condemns the smaller cruisers Desaix, Kléber, and Dupleix, though they are better armed than the Dupetit-Thouars class, in proportion to their size, as not sufficiently powerful to serve as *croiseurs d'avant-garde*, but too costly to be employed on foreign stations. They represent a compromise between the protected and armoured cruisers which is not likely to be repeated in France.

Fürst Bismarck. The Fürst Bismarck is considerably inferior in nominal speed to the other ships which we are considering, but she carries a good armament, the larger pieces of which are all mounted in casemates or turrets, and she is protected by a complete water-line belt 7¾ in. in thickness, and by a 3-in. deck. A reference to plate 48 will show that the armament is not so well distributed as in most cruisers, and is mounted in three groups—one amidships and the others at either end of the ship.

Italian cruisers. The many cruisers of the Garibaldi type recently built in Italy are wonderful ships for their size. They carry a tremendous armament

* Guichen, Chateau-Renault.
† Columbia, Minneapolis.

for their size, and they have a very large area of side protected by 6-in. armour. The Francesco Ferrucio is about 500 tons larger than previous ships of this type, and carries an even better armament, viz., one 10-in. and two 8-in. Q.-F. guns in place of two 10-in. in the barbettes forward and aft, and fourteen 6-in. Q.-F. in place of ten 6-in. and six 4·7-in. Q.-F. guns. Ten of the 6-in. guns are mounted in a redoubt on the main deck, protected by 6-in. armour, and the upper deck guns are protected by 1·8-in. plating on the side as well as by shields. We have already discussed with reference to battleships the advantages and disadvantages of the redoubt as compared with the casemate system of protection. Every ship of war is a compromise, and the Francesco Ferrucio class are not remarkable for either speed or coal endurance. The speed is 20 knots, and the normal coal supply is set down at 650 tons, which, with bunkers full, can probably be increased to 1000–1200 tons.

Gromoboi. The Russian Gromoboi is apparently the same type as the Rossia and the Rurik. The number of guns of the larger calibre is identical; but the fact that the 8-in. guns of the Gromoboi are to be quick-firing makes a tremendous increase in the energy of fire that can be delivered per minute. The weakness of the Rurik and of the Rossia consists in the fact that the batteries are almost without protection. Unless this weakness is to be remedied in the Gromoboi, she cannot, in spite of her overwhelming armament, be considered a powerful ship.

Asama type. The Japanese Asama and her sisters are very fine vessels. The hull is well protected by a 7-in. to 3½-in. belt, and by 5 in. of armour on the side above the belt to the level of the main deck. No other cruiser is better protected than this. They possess a most powerful armament, which is well distributed, but it should be noted that four of the 6-in. Q.-F. guns are mounted behind shields, which naturally afford much less effective protection than a casemate. The writer has had the opportunity of visiting these ships. They should be well able to keep the sea.

O'Higgins. The Chilian O'Higgins, again, is a most powerful ship for her size. As in the Asama, all the 8-in., and all except four of the 6-in. Q.-F. guns, are mounted in casemates or barbettes. There is no side armour above the belt as in the Asama. Her speed on trial was over 22 knots. She has less freeboard than most of the other cruisers, but while therefore difficult to hit, would probably be a wet ship in bad weather.

In the opinion of the writer, the Asama is the most effective type of cruiser now built or building. Some cruisers of the Garibaldi class would be a most valuable addition to any navy. They are so

well protected and so well armed as to have a reasonable chance of holding their own against any but a first-class battleship.

Few Powers are at present building second-class cruisers. We have the Hermes class, which in point of armament are a great improvement on their predecessors, the Russians the Aurora class,* and the Germans the Freya class. The following table gives their principal features compared with the new Elswick-built Chinese cruisers. Second-class cruisers.

	HERMES.	AURORA.	FREYA.	HAI-CHI.
Displacement . .	5600 tons.	6630 tons.	5650 tons.	4300 tons.
Length	350 ft.	413 ft.	344 ft. 6 in.	396 ft.
Beam	54 ft.	55 ft. 9 in.	57 ft.	46 ft. 8 in.
Draught . . .	21 ft.	21 ft.	21 ft. 8 in.	18 ft. 6 in.
Speed	20	20	20	24
I.H.P.	10,000'	11,600	10,000	17,000
Armament . . .	11 6-in. Q.F. 17 smaller.	6 5·9-in. Q.F. 6 4·7-in. 27 smaller.	2 8·2-in. Q.F. 8 6-in. Q.F. 10 3·4-in. 10 1·4-in.	2 8-in. Q.F. 10 4·7-in. 12 3-pr.
Armour—				
Gun position .	4½ in.	?	4 in. H.S.	6 in.
Deck	1½–3 in.	2½	4 in. H.S.	5 in.
Coal supply . .	550 1000	.. ..	500 950	 1000

There is not much to choose between the three first of these cruisers. They are all lacking in speed. For service on foreign stations—on the China, Cape of Good Hope, or North American stations—the Hermes may be a suitable type; but for service as the scouts of a battle squadron or as commerce destroyers, vessels of the type of the Hai-Chi, well armed and of very high speed, seem preferable. The French Jurien de la Gravière, of 5413 tons, has a speed of 23 knots, and carries 900 tons of coal; but her armament only comprises eight 6·4-in. and twelve 1·8-in. Q.-F. guns.

* The Aurora and her sisters are included in the first-class in the tables in Chapter III., but they compare better with the Hermes, etc., than with the Cressy, the Jeanne d'Arc or the Gromoboi.

T. A. BRASSEY,
Assisted by C. ORDE BROWNE.

CHAPTER VII.

BRITISH COAST FORTIFICATIONS.

WHAT PLACES OUGHT WE TO FORTIFY, AND TO WHAT EXTENT?

THE *Naval Annual* for 1897 contained a chapter on "The Limitations on Passive Defence," by Colonel Sir George Clarke, in which was given an exposition of the principles governing, or that ought to govern, the relations between the passive and the other branches of our national system of defence. It is, therefore, only becoming to offer some apology to the readers of the *Annual* for returning to a subject which had been so authoritatively discussed only two years ago. The truth is that, notwithstanding the impregnability of Sir George's arguments, an impregnability proved to demonstration by the omission of any real attempt to assault them, there are signs of a deplorable and, indeed, alarming disposition to ignore the principles which those arguments so cogently enforced. To borrow a metaphor from the subject in question, it may be said that the sectaries, who—after the manner of sectaries always and everywhere—adhere with illogical persistence to their favourite heresy, passive defence, have decided to pass stealthily by the citadel of argument in which true principles are deposited, because they dare not assault the works of that fortress. The time has come to give in rather more minute detail, with a view to a more special application, the reasons why the menacing reaction against the policy of efficient defence should be at once and firmly withstood.

No one demands, no one has ever demanded, that the British Empire should be without any coast fortifications at all. The *intransigentes* of the passive defence sect, the persons who believe that a great maritime empire can be best defended by adopting a policy of "bricklaying," have, it is true, gratuitously created a body to which they have given the name of "The Extreme Naval School," and to which they attribute a desire to dispense with all coast fortification whatever. The "School" and the desire attributed to it are equally non-existent. Unfortunately, it is necessary to make this clear, because the bogey of the so-called "Extreme Naval School" is often brought out for the purpose of scaring away those

whose minds are open to argument on the subject of our national defences, it not being thought at all discreditable to allege that there are naval officers, having the ear of the public, who, because they point out the objections to overdone passive defences, wish to stop any increase to the army, and consider the whole volunteer force useless. There is no more appropriate place than the *Annual* in which to express the real naval view of defence by means of coast fortification.

Looked at from the standpoint of the Navy, the ports of the British Empire may be divided into three classes:—

1. Commercial ports.
2. Naval (or dockyard) ports.
3. Supply ports (so-called "coaling stations").

Commercial ports.

The ports in class 1 require no fortification of the passive sort at all. The attacks to which they are most liable are not of the kind that could be best met by providing them with passive defences. It is to men, not to brick-laying, that they must look for local protection. The bombardment of an unfortified commercial seaport by way of reprisal or punishment for some infraction of the "laws of war" is a conceivable contingency. The bombardment of a place so conditioned out of a mere desire to do mischief, or in the hope of enforcing the payment of a sum of money, is not more probable than an attack on it by means of incendiary or explosive contrivances let down from balloons, a form of attack against which not even the most thorough-going "bricklayer" has as yet suggested any system of protection. If the places in question are to be defended with submarine mines, it must be in accordance with one of two methods: either the greater part of the mines must be kept permanently in place, or the system must be so arranged that the whole of it can be laid down in a short time. The adoption of the former method will cause great inconvenience to the traffic of the port; that is, to the very thing to which it owes its prosperity if not its existence. The experience of New York in the late Spanish-American conflict, exactly fulfilling the predictions of intelligent students of the history of naval warfare, and reproducing in important features the case of the German ports in the war of 1870–71, has shown us that the inconvenience becomes so intolerable that the "defences" have to be removed. How much more intolerable we should find the denial of our own channels to our own vessels, especially at the ports of the United Kingdom, which draws so much of its food-supply from across the sea, need not be dwelt upon. To carry out the second of the two above-named methods would require an amount of time which would

more than suffice to assemble the armed defenders whose presence, if in the right strength and with efficient organisation, will secure the place against hostile molestation far better than obstructed channels or fixed batteries.

The most formidable enemies whom the British Empire is likely to encounter are powers with large armies, but with navies numerically inferior to ours. If the sea is so clear of British men-of-war that any of them can send a man-of-war of its own to bombard one of our commercial ports, it is certain that the sea is clear enough for the despatch of a swift steamer, or several swift steamers, carrying parties of soldiers ready for landing and for early re-embarkation. This kind of operation would be more within the competence of each of the great military powers of continental Europe than an expedition composed of even three or four cruisers. Should the operation fail, or should it at first succeed, but the returning vessels be met and destroyed by the British navy, the loss of ships of war would be much more serious to an already inferior naval power than the loss of several hired steamers and fifteen hundred or even a couple of thousand men to a state with over a million soldiers in the ranks. The history of war down to and including that waged within the last twelve months between Spain and the United States proves that against a landing operation, such as that just indicated, passive defences designed to keep off ships would afford but insignificant protection. Once begin to fortify commercial ports and you will find that it passes the wit of man to say where you can stop. If an enemy were contemplating the extortion of a money payment under threat of bombardment he would have hopes of a bigger sum from Brighton than from Holyhead, from Margate than from Harwich. If Brighton and Margate are to be defended against risk of being "requisitioned," could Scarborough or Hastings be left undefended? and so on until we come to Oban and smaller places. The objections inseparably connected with this unavoidable want of finality of passive defences would not make themselves felt in a system of defence depending chiefly on *personnel*, whilst the latter system would afford a more effectual guarantee against the war risks which the "passive" plan is expected by its advocates, and by them only, to abolish.

Protection for anchorages.

Fortification of commercial ports is often, indeed almost always, confounded by the passive defence sect with the establishment of coast batteries armed with long-range guns of medium calibre for the protection of certain anchorages of a special and rare character. In the British Empire there are some, but not many, fairly sheltered but open-mouthed bays in which circumstances, even in time of

peace, make it convenient for our merchant vessels to anchor. It is not improbable that these places will be as much frequented in time of war as at present, perhaps even more so. One can see at once that it is quite permissible to give, not to the anchorage as a mere locality, but to the vessels using it, an amount of protection by batteries, or at any rate by guns on shore, which would put a real hindrance in the way of an enemy's ship intent on making captures and not deterred by local difficulties of navigation from entering a sheet of water which by the assumption is easy of access and spacious enough to admit of manœuvring. This is about the only case in which fortifications can effectively defend the shipping of a nation which has not lost command of the sea. It is obvious that it can occur only rarely. There is good reason for thinking that the shipping sheltering in the anchorage can be quite as effectually defended by guns which are not tied down to fixed positions. A suitably laid out and not greatly exposed coast road,* along which artillery could easily travel, and on which good positions could be found, would sometimes, perhaps always, be a better object on which to spend money than the masonry and mounds of earth of fixed batteries; whilst the movable guns could shoot at least as straight as, and, from their capability of movement, often from more advantageous positions than, guns tied to battery sites. In all this, let it be noted, there is no argument for piling up fortifications for the local defence of commercial ports, especially of such as are already largely defended by natural conditions of site, being on close harbours or well inside the mouths of tortuously-channelled estuaries or rivers.

Dockyard ports.

The case of the naval or dockyard ports differs greatly from that of the commercial ports. If a dockyard had no defences, neither fortifications nor garrison, it is obvious that it would be at the mercy of a handful of armed assailants. The very existence of a dockyard, if it really deserve the name, presupposes an accumulation of valuable and even indispensable *matériel* within a space of relatively limited extent. The whereabouts of this accumulation would be exactly known to the enemy, and it would be worth his while to make a considerable effort, and run considerable risk, to destroy or seriously injure it. Nevertheless, until he had got command of the sea he would not be able to bring against it any force so large that its movements would be unlikely to escape detection; that is to say, any force so large that it would be competent to undertake a sustained or protracted belligerent operation. If, being a great military power, he had succeeded in getting command of the sea, he

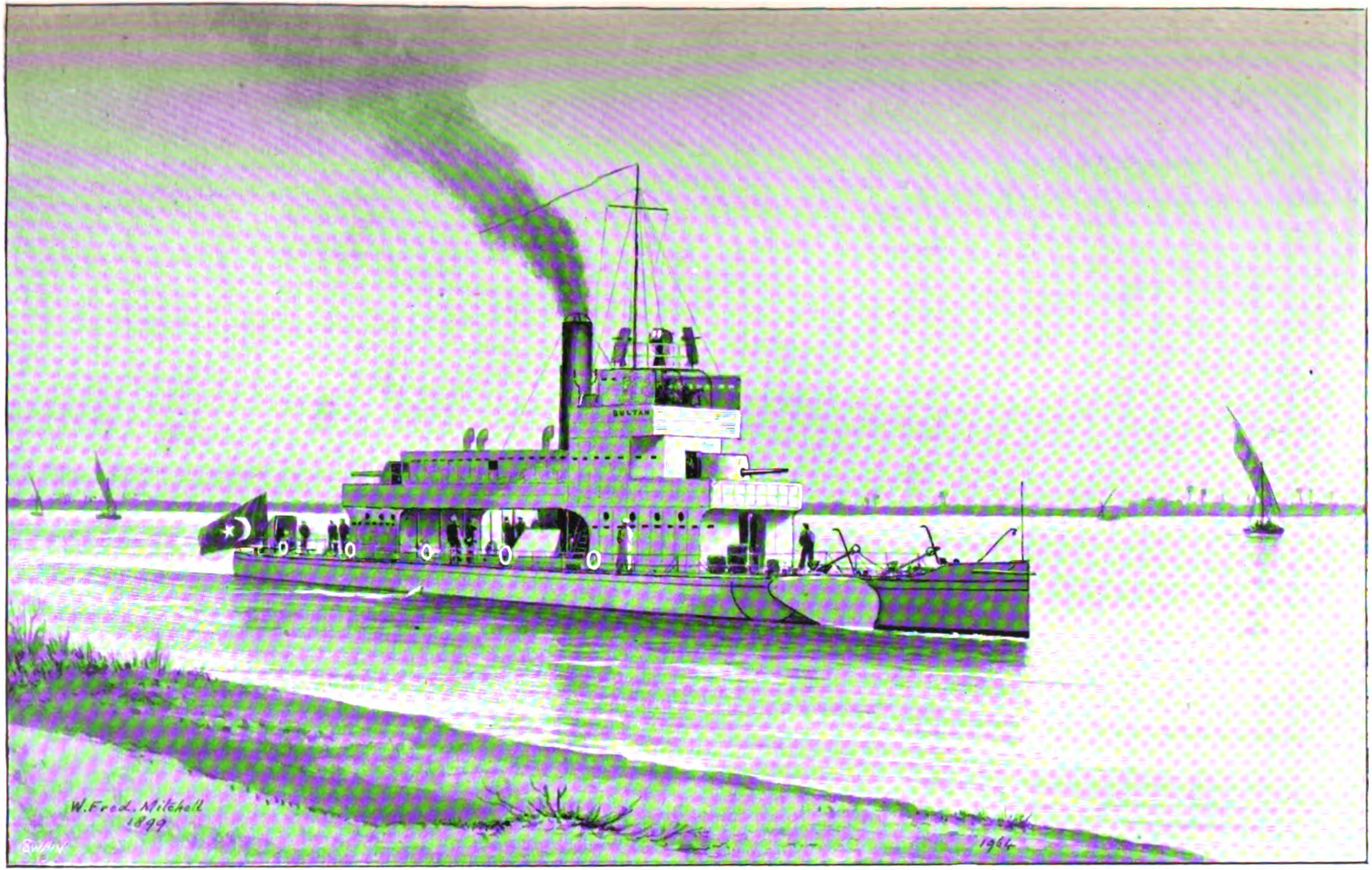
* It is of some interest to remember that on the L. B. and S. Coast Railway, which runs along the coast, a gun has been mounted on, and fired from a movable truck.

would be able to do what he liked with a dockyard, as with any other port, without sending a regular naval expedition against it. This gives the measure of the passive defences with which a British dockyard port should be provided. The amount will rise and fall in the direct ratio of the proximity of the port to the base of the enemy's navy. The oscillation, however, will not be great; so that, if it will tend to tranquillise timid minds, we may take as a standard the upper limit.

In the wars in which this country has had to contend with serious, well-equipped enemies, the command of the sea has either been conceded to us from the beginning, as in the Russian War of 1854–56, or has been won by us after fighting for it. However unchallenged our hold of it may have been, we never took advantage of it to make prolonged* attacks on the dockyard ports of our foes. There probably was not a soul in England in the earlier years of this century who thought that we could have utilised our command of the sea better by sending our fleets to dash themselves against the fortifications of Toulon than by keeping up the "stream of supplies and reinforcements" needed by Wellington's armies on the Continent. To naval officers at all events it is inconceivable that an enemy who does not hold the unchallenged command of the sea will venture to attempt anything more serious against a British dockyard than a hasty operation or, at most, one planned to last but a short time. To carry out an operation of the kind an armour-clad fleet would not have to be employed; and, even if it had to be, the command of the sea, by the conditions of the case, not having gone from us, our own fleet would not allow it to be used. It is to get over this difficulty that the advocates of passive defence *à toute outrance* have invented the now generally blown-upon theory of "decoying away" the British fleet.

Amount of defence required. The standard of passive defence for a dockyard port in the United Kingdom may, therefore, be fixed with a fair approach to certainty. Indeed the limits of variation from certainty on either side need not lie far apart. No doubt we must not lose sight of the fact that, at the close of the nineteenth century, the provision of inert material in huge masses has a tranquillising effect on timid minds. We know, on the authority of Lord St. Vincent, that these always have to be reckoned with. Of course it is impossible to concede to them the only thing that would fully remove their apprehensions, viz., the erection of a continuous Chinese Wall round the coasts of Great

* The Anglo-French command of the Baltic in 1855 was unchallenged; but the naval attack on Sweåborg lasted only 48 hours. The attack by the French and English fleets on Sebastopol in 1854 began about 1 P.M. and ended as evening came on. It lasted 5 to 6 hours.



"SULTAN,"
NILE GUNBOAT.

Britain and Ireland; but the upper limit of strength above alluded to may be taken in fixing the standard of passive defences for ports of the class at present under consideration. Naval attacks upon such ports will, if made at all, be made by a part only of the enemy's navy—by a part only of the fleet which, it may be allowed, he would be able to assemble. Our own fleet being still "in being" *—if we may use the term without offence, for its use appears to have a deplorably exasperating effect on certain minds—the ships chosen for making the attacks would necessarily have to be fast. They would not, therefore, be of the heavier "battleship" class.

Guns. To repel attacks made by ships of moderate defensive powers in moderate number, ships moreover which could not, on pain of being caught *en flagrant délit,* give more than a short time to the business, the most powerful gun required would be one about equal to our present 9·2-in. breech-loading weapon. Of such pieces a small number would suffice; whilst, as it is more important to hit one's enemy with shot of moderate weight than miss him with heavy shot, guns of the character of our 6-in. Q.-F. should form the more numerous portion of the armament. However desirable it may be to sink a hostile ship—a thing, by the way, which happens oftener at Earl's Court than in real warfare—it should not be forgotten that she may be driven off long before she is in a state making it likely that she will go to the bottom. The great thing is to shoot at her straight and shoot at her often. The seaman's mind is so constituted, odd as some may find it, that he has just as great an objection to being killed or wounded in an unarmoured ship, or in an unarmoured part of one, as in an armoured. This being so, it will be well if, in addition to those mentioned, the armament contains lighter guns. It is certain that a port defended in the manner thus outlined would, as far as passive defences go, be fully equal to repelling the only naval attacks likely to be made upon it.

Garrison. This does not, however, quite exhaust the subject. There must be a proper garrison, and the guns must be of the proper pattern. Erecting "monumental" works of defence and letting them remain armed with obsolete pieces of the soda-water bottle type is to "go one better" than the Chinese of 1840–41, with their tiger shields and dummy forts. Putting a proper garrison in a dockyard port is a very different thing from cramming the place full of efficient soldiers who in war would be more urgently wanted elsewhere. The *rôle* of the British army in the past has not been to

* The phrase may be interpreted here—"still undefeated," or "still efficient and ready for action."

remain quiescent behind fortifications, no matter how scientifically designed, awaiting attacks that in all cases are unlikely, and in some, if not in most, are sure not to be made. Its glories have been won on foreign, often on distant fields—by assuming the offensive, in fact. The brilliancy of its achievements and the success which crowned its efforts have eminently justified the manner of its service. That in really great contests in the future it will be employed in the way that accords with its glorious traditions may be taken as certain. It is this which makes naval officers, quite as earnestly as their brothers-in-arms of the land service, desire to see our army numerically strong, to see it increased up to the level of the demands nearly sure to be made upon it. In such a prospect there is no place for enormous sedentary garrisons. Until it is understood and acted on that the relation between strength of garrison and scale of passive defence works is close and of fundamental importance, no scheme of fortification can be satisfactory.

Supply ports ("coaling stations").

We shall find convincing evidence of the truth of this when considering the case of the ports in the third class, to which we have now come. These are the so-called "coaling stations." As men-of-war require a good many things besides coal, it will be convenient to call the places from which they must draw their supplies "supply stations." When liquid fuel comes into general use "coaling station" will be rather a perplexing term. The number and position of these have to be settled. The researches of the "Carnarvon Commission," some eighteen years ago, revealed to us the way in which the former is apt to overflow all bounds of prudence or strategic necessity. Because a place has a good harbour and sufficient water frontage to afford sites for wharves, some "strategists" declare that it ought to be made a fortified supply station. Other conditions, however, have to be satisfied. Stations must be "spaced," for if they are too close together the value of any one is impaired by the proximity of the others. Also their position must have some definite relation to the probable employment of the ships to be supplied by them in war.

Number should be limited.

It is often said, when an additional station is proposed, that the new establishment, if it does not do any good, will at any rate not do any harm. The worst of this statement is that it is not true. Every station beyond the requisite minimum not only does do harm, but also in war may be the cause of much and grievous harm. In peace time its maintenance causes useless expenditure and complicates the storage and issue of supplies. Many stations of the class in question produce few of the articles deposited in their magazines; none produce all; some produce none. In certain cases the local production of food is not enough for their regular inhabitants, much less for their

inhabitants *plus* their garrisons. It is obvious, therefore, that in time of war the necessary "stream of supplies and reinforcements" must flow to them with the least possible interruption. In other words, their communications must be kept open. As the line of these communications runs across the sea, the duty of keeping them open must be discharged by the navy, and by the navy alone. Argument and experience both show what a heavy burden this is for a fleet. Should anyone wish to learn the verdict of history on this question let him turn to the case of Darby's "relief" of Gibraltar, and let him note the connection of De Grasse's movements with it and its general effect on the campaign.

It follows, then, that "outlying bases," as supply stations are sometimes called, must not be numerous. It also follows, especially where they draw their food as well as their equipment and reliefs from over-sea, that the garrisons should not be large. As in the case of the dockyard ports, so here again, there is a distinct relation between strength of garrison and amount of passive fortification. Experience has shown that the absurdity of constructing passive defences on so grand a scale that no permissible garrison would suffice to "man" them is not an imaginary one. The standard of strength in men and fortifications depends upon the character of the probable attack. If the enemy's naval predominance is such that he can bring a powerful force against the place and can engage in a protracted operation for its reduction, then our navy will have been unable to keep open its communications and the place will fall in time, garrison and fortifications notwithstanding. Against minor attempts, such as those which could be made by a force small enough to elude our squadrons for short periods, the place ought to be secured by being garrisoned and fortified up to the requisite amount. It would not be difficult to ascertain what this amount should be, the respective forces of the two belligerents being known. The necessity for arming the works with heavy armour-piercing guns, even in these days of armoured cruisers, will not arise. It is easy to silence or drive off an armoured cruiser, if she does not keep up a vigorous return fire, without touching her armour. This can be done with guns of a type equivalent to that of our 6-in. Q.-F., or even with lighter pieces. Though it may not accord with the postulates of the passive theory of defence, it is nevertheless true that seamen dislike being killed by a projectile fired from a 12-pr. Q.-F. as much as by one from a 50-ton gun.

Garrison required.

The history of many colonial expeditions teaches us that attempts to take an enemy's possession by an attack of short duration are nearly sure to miscarry unless the assailants are from three to four

times as numerous as the defenders. Here, in combination with what we know as to the numbers necessary to work the armament of the forts, we find information as to the proper strength of the garrison of a particular station. Small groups of ships, we are aware, can slip past our squadrons unobserved for a time; but it is highly improbable that a hostile squadron large enough to give secure convoy to a landing force of 5000 or 6000 men with all their *impedimenta*, organised and equipped, as they would have to be, for active service following immediately on disembarkation in an enemy's country, could entirely escape the notice of our navy, or not be quickly followed by it to the scene of operations. Human nature remaining pretty much the same, and there having been no measurable change in the average amount of valour, intelligence, and resolution of fighting men, we may learn a great deal that will be useful to us now from the history of the "colonial expeditions" of the last, and the early part of this, century.

Position of supply ports.

If a supply station is situated on a continent we know from history that it is liable to attack by a land force of practically unlimited strength. The lesson which a maritime, insular people ought to learn from this is, "Don't establish supply stations in continental positions if you can help it." There is another lesson which, if not directly conveyed by, can be deduced from, history. It is, "The nearer a supply station, though on an island, is to the principal base of a powerful enemy the larger must its garrison be." This furnishes a good reason for avoiding the creation of permanent establishments in close proximity to the home of a powerful enemy. A general survey of all the conditions will result in forcing on us the conviction that we ought to keep down as much as possible the number of British coast fortifications in distant parts of the world. There is good reason for thinking, and some historical evidence to support the conclusion, that the convenience in meeting the needs of a squadron, generally attributed to the possession of numerous permanently fortified supply stations, has been much exaggerated. The experience of the American navy during its operations against Santiago de Cuba, conforming to the experience of the Federal navy in the War of Secession, shows that it is an assailant's object to push his immediate base as far forward and as near to the point assailed as he can. Considering that in any case the communications must be kept open, and that this must be done by the navy, it is likely to be mere waste of effort to cause the stream of supplies to flow first to the permanently fortified station, and, after delay or transhipment there, continue its course to the ships requiring the supplies. At the same time it may prove extremely inconvenient to send ships to a

more or less distant port at which supplies have been accumulated, simply because costly storehouses and more costly passive defence works had been established there. It is worth remembering that if a garrison is found to have been stationed in the wrong place, the men can be transferred to a more suitable scene; whilst coast fortifications, more especially if of a "monumental" character, that may have been erroneously placed are incapable of translation.

Experience, argument, and impartial investigation of conditions agree in demonstrating that coast fortification holds but a small, even insignificant, place in any proper scheme of British imperial defence. It is in no way a constant quantity; but, within its own essentially narrow limits, it varies according to circumstances as much as the composition of more mobile forces varies with the circumstances in which they will have to conduct their operations. It is possible in each particular case to fix the amount required; as it is, generally, to fix the whole number of British stations that should be fortified. Fortification, much to the detriment of that freedom of traffic on which the prosperity of the British empire depends, and will depend even in war, has been made to include obstruction of channels by under-water mines. These obstacles to that commerce, to preserve which the British Empire is more likely to go to war than for any other reason, cannot be anything but a nuisance except at a few specially conditioned ports, and at these their defensive value will hardly be found to be very high. Small as is the place that passive fortification has always occupied and must always occupy in our general scheme of defence, its limits admit of determination. All that is necessary is to consider the questions involved in it in, to use the fashionable slang of the day, a "scientific" spirit. In plain English, we ought to apply common-sense to the consideration of the subject as a whole and of each particular case. If, however, we draw our principles of defence from unsupported theories, and adopt a little bit of one theory here, and a little bit of another there, we may add to the number of the forts and batteries which already stud our coasts at vast cost in money, while in no way advancing the security of the Empire.

CHAPTER VIII.

The Operations of the Gunboats during the Soudan Campaign.

The gunboat flotilla engaged in the operations that terminated in the defeat of the Khalifa outside Omdurman consisted of the following: —Melik, Sheikh, and Sultan (twin-screw gunboats); Zafir, Nassr, and Fatteh (large stern-wheelers); Tamai, Metemmeh, Hafir (formerly El Teb), and Abu Klea (small stern-wheelers). In addition, there were the Dal, Kaibar, and Akasha (small stern-wheelers), armed with machine-guns only, and the Tahra, a small paddle-steamer.

Melik class.

The Melik class were new twin-screw gunboats, designed and built in England. They went through their trials there, and were taken to pieces, sent out by steamer to Egypt, and then by rail and boat to Abadia, a riverside camp about fifteen miles down stream of Berber. Here they were put together under the superintendence of Mr. Bond, Engineer, Royal Navy, and Major Gordon, R.E., being completed just before the advance of the army. Their armament was two 12-pr. Q.-F. guns, one forward and one aft, with a good command of fire; four Maxim guns of ·45 calibre on a high battery amidships (with alternative mountings lower down); and a howitzer (about 4-in.) on the forecastle. The ammunition for the Q.-F. guns was shrapnel with Krupp time fuse, common, double, and case. As fighting machines the Melik class were very powerful, and the protection from rifle fire was very good. Their engines were better protected than in the case of the stern-wheelers, but against this, the engines were more complicated, and the engine rooms hotter. The repairs necessary to these high-speed engines proved more frequent, and required more skilled labour than in the case of the slow-moving and simple stern-wheel engines. In respect to draught of water, the Melik class were far better than the stern-wheelers, as they drew only 2 ft. against 2 ft. 6 in. or 2 ft. 9 in. The operations around Omdurman, however, being carried out at the top of the Nile, their small draught of water did not carry the same advantages that would have accrued at low Nile. At low Nile the advantage would be very great. For towing heavy barges they did not prove so efficient as the heavier and deeper draught stern-wheelers.

The Zafir class were intended for the Dongola Expedition, but, owing to delays in delivery, only the Zafir was completed in time. The Nassr and Fatteh were put together early in 1897, above the Second Cataract; they steamed through the Third Cataract as soon as there was sufficient water, and were pulled through the Fourth Cataract in the autumn of 1897, about the same time as the capture of Abu Hamed. On news being received at Abu Hamed of the evacuation of Berber by the Dervishes, the steamers pushed on at once with troops. The Nile was then at its height (early September), and the Fifth Cataract was passed through under steam without any difficulty, no ropes at all being necessary. Berber was occupied on September 6, and from then until the final advance, a year later, the three steamers of the Zafir class were continuously employed in turn in patrolling the river between the Atbara camp and the Dervish positions at Metemmeh, Shendy, and Shabluka. They proved themselves thoroughly efficient in every way, their engines being large and simple, and easy to keep in order, even with the meagre appliances sometimes available. Their boilers were large, giving reserve power for towing purposes, and enabling the speed to be fairly well maintained, even when burning green wood. They drew about 2 ft. 9 in. of water when loaded, being very handy to turn and very steady on their helm. Their armament was one 12-pr. Q.-F. gun forward, and, in a central battery on a higher position, two 6-pr. Q.-F. guns (one on each bow), and three Maxim guns of ·45-in. calibre. The command of the 6-prs. and Maxims was very good, enabling the banks of the river to be searched out at half Nile, and in some places even at low Nile, when the 12-pr. in the lower position was useless. There were alternative positions for the Maxim guns, so that all three could be concentrated on either side. At low Nile it was found necessary to raise the Maxims even higher, so two light platforms were built, raising them another 12 feet or so. **Zafir class.**

At first sight the stern wheel may appear to be a great disadvantage, owing to the liability to damage from shell fire, but this is a great deal more apparent than real. The knocking away of a few paddles, or even a slight bending of the frame of the wheel, would not cause immediate stopping of the engines. The crank and connecting-rod for the stern wheel are of course always well above water, and if they are damaged the engines are disabled, but it must be remembered that they are very small, and not visible. Many important parts of the engines of the twin-screw boats are above water, though they do not offer a target. There is another great advantage in the stern wheel, very valuable in a narrow river. Where there is not sufficient room to turn going ahead, the boat will turn on the stern wheel as a pivot, **Stern-wheelers.**

with the engines going full speed astern. Once the bow has started to swing, very little stern-way is gathered, and the boats can be turned in their own length with great rapidity. For towing work they proved themselves very efficient, and the heavy transport of troops and stores was performed almost entirely by the stern-wheelers.

Tamai class.

The Tamai class, built for the expedition in 1884–5, were about 90 ft. long, and drew about 2 ft. 6 in. of water. They have for years proved their suitability as river steamers, combining in a small displacement, speed, towing power, fair armament, extreme handiness, simplicity of all working parts, and comfort. Their armament was one 9-c.m. Krupp forward, and two ·45-in. Nordenfelts on the upper battery.

The Dal, Kaibar, and Akasha were stern-wheelers of about the same size as the Tamai class, but more powerful for towing and not armed as gunboats. The Tahra was a small paddle steamer, built at Khartoum by General Gordon, and used afterwards for years by the Dervishes, sunk at the battle of Hafir, and finally refloated and repaired to join the Egyptian Flotilla.

Gunboats' crews.

The general arrangement of the manning of the gunboats was :— One English officer in command ; two European engineers ; one or two sergeants, Royal Marine Artillery, who were invaluable on all occasions. Fighting crew, Egyptian artillerymen ; working crew, Arab sailors and black firemen. There were two companies of garrison artillery told off for the gunboats. The senior artillery officer was in the flagship, and the others divided among the various boats. The number of gunners was about twenty-seven to twenty-three for the Melik and Zafir classes, eleven for the Tamai class. The sailors came from Shellal (Assouan), and consisted of the Chief Reis, 2nd Reis, and eight crew for the bigger, five for the smaller boats. They kept the boat clean (except guns), worked the ropes, anchors, &c., under the command of the chief Reis. The firemen and trimmers were mostly blacks, there being eight for the bigger and five for the smaller gunboats.

For the final engagement the flotilla was as follows :—

Sultan . .	Commander Keppel, R.N. ; Lieut. Cowan, R.N.
Nassr . .	Lieut. Hood, Royal Navy.
Fatteh . .	Lieut. Beatty, Royal Navy.
Sheikh . .	Lieut. Sparkes, Royal Navy.
Hafir . . .	Lieut. Staveley, Royal Navy.
Tamai . .	Lieut. Talbot, Royal Navy.
Melik . .	Major Gordon, R.E.
Abu Klea .	Lieut. Newcombe, R.E.
Metemmeh .	Lieut. Stevenson, R.E.

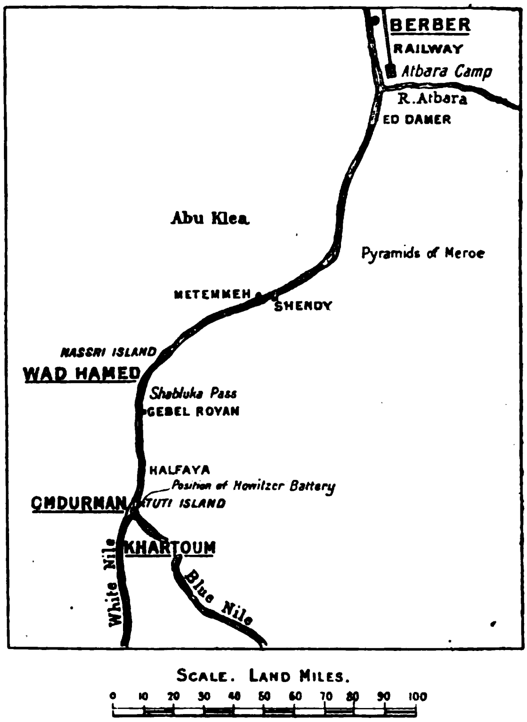
Work of gunboats.

The work of the steamers during the period from the middle of July till the middle of September may be described shortly as follows :—

(1.) Formation of depôt of stores at Nassri Island before the advance of troops.

(2.) Formation of large camp of concentration at Wad Hamid, and transport of entire army, ammunition, and stores from Atbara Camp to Wad Hamid.

(3.) Transport of stores and ammunition daily from camp to camp during the advance of the army from Wad Hamid towards Omdurman.



(4.) Formation of a depôt of stores at Gebel Royan, and the towing of all sailing boats and barges through the Shabluka Pass.

(5.) Reconnaissance of Omdurman and Khartoum on the day before the battle, and landing of the howitzer battery.

(6.) Battle.

(7.) Immediate pursuit up the White Nile.

(8.) Trip to Fashoda.

Depôt at Nassri Island.

Nassri Island is a large island situated about fifteen miles below Shabluka Cataract, and by the "Influence of Sea Power" a depôt of

stores (chiefly forage for the animals) was safely established there during the latter end of July, while the adjacent mainland was still occasionally visited by Dervish patrols.

Camp at Wad Hamid.

During July several of the Egyptian battalions advanced some way south of the Atbara Camp and formed great wood stations for the gunboats, so that no delay should be caused in the final transport of the army and stores. The real advance of the Egyptian Army, however, commenced on the morning of August 3, when the two Black Brigades, consisting of 9th, 10th, 11th, 12th, 13th, and 14th Soudanese battalions, left the Atbara Camp in six steamers for Wad Hamid. The troops were carried partly in the steamers, partly in large steel double-decked barges, and partly in native boats (gyassas). The steamers of the Zafir class towed two barges and two gyassas each; the Tamai class three gyassas each; and the Akasha class two barges each. Wad Hamid being only about sixty miles from Omdurman, it was necessary that as many men should be landed as possible to form the camp. The average storage was as follows:—In each barge 320 to 340 men; in each gyassa 75 to 120, according to size of boat; in steamer of Zafir class 250 men; in steamers of Tamai and Akasha classes 50 to 100 men. The totals, therefore, in addition to the crew amounted to roughly—for each steamer of the Zafir class 1100 men; for each steamer of the Tamai class 350 men; for each steamer of the Akasha class 750 men.

The speed towing these great weights was necessarily slow, but by going day and night the trip from Atbara Camp to Wad Hamid took on the average three days. The Nile being nearly at its height, the river was quite easy, there were no dangerous rocks, and the only thing necessary was to increase the rate of progress by taking advantage of all the slack water that could be found. The men came on board in their loose white clothes with a blanket. Two days' food was ready cooked, and for the third day the meals were cooked as best they could without delaying the passage.

General Hunter landed at Wad Hamid on August 6, and during that day and the next all the steamers arrived, and having landed troops and stores, proceeded immediately down stream, the passage down with empty barges occupying about twelve hours. When British troops were carried the stowage was not so close, the numbers being about one-third less.

The Egyptian Cavalry and Camel Corps, the 21st Lancers (with the exception of the last squadron), and all the transport mules and camels crossed the river from the Atbara Camp and marched along the left bank of the river; but with these exceptions the whole army was carried from the Atbara Camp to Wad Hamid by the steamers.

By August 25 the last boatloads arrived at the Wad Hamid Camp. During all this time the steamers burnt wood as fuel, but before leaving the Atbara Camp for the last time, coal was taken in—about 30 tons for the Zafir and Melik classes, and 10 tons or so for the smaller ones. A large quantity of ammunition, making a total of over 500 rounds per gun, was also embarked.

Advance from Wad Hamid.

As the army advanced from camp to camp, the steamers were employed in towing the barges and sailing-boats with supplies; also a barge containing the howitzer battery and ammunition, a gyassa containing two 40-pr. R.B.L. and ammunition, and a barge fitted as a field hospital. Other steamers went back to Nassri Island to clear the depôt there of all men and stores, and bring all up to the army. Others again (usually the Melik class) moved slightly ahead of the army.

Gebel Royan and Shabluka Pass.

A depôt of stores was formed at Gebel Royan, just above the Shabluka Pass, on the right bank of the river. The Shabluka Pass did not present any very great difficulty; there was plenty of water, in some places the stream was very strong, but the steamers were able to go through under steam, towing heavy barges and gyassas. The actual gate of the Shabluka Cataract did not have to be passed through; as, the Nile being at its height, there was a channel which presented no difficulty, and which avoided the bad rocks and narrow gate of the Shabluka Cataract. At half or low Nile, however, the rocky channel would be the only one available. There were several forts at the entrance to the Shabluka Pass, commanding the cataract, but they were all deserted. The Dervishes had at one time stretched a chain across the narrow gate, but knowing that it would be useless at high Nile, owing to the alternative channel, it was removed shortly before the advance of the Anglo-Egyptian army.

As the gunboats emerged from the Shabluka Pass, their stores were landed as required, either with the army on the left bank, or at the depôt at Gebel Royan on the right bank, the gunboat descending again immediately to help on the sailing-boats. It had been intended that the sailing-boats should be tracked through the Pass, men from all the battalions being employed in the work; but owing to the very strong southerly wind which blew persistently, and to the thick bushes and trees close to the bank of the river, their progress was very slow, and they were all finally towed by the steamers.

As the army advanced from Gebel Royan, the steamers were employed partly in patrolling on the left flank of the army, partly in towing up the hospital and artillery barges, and partly in running backwards and forwards from the army to the depôt at Gebel

Royan. At each halting place the transport camels came to the boats to get a fresh load.

Recon-naissance Sept. 1.

At daybreak on September 1 the army advanced, halting about noon near Kerreri. The gunboats pushed on to make a reconnaissance in force, and to land the howitzer battery in a safe position for shelling Omdurman. The gunboats engaged were the Sultan (flagship), Nassr, Fatteh, Sheikh and Melik, and the Tamai towing the barge containing the howitzer battery. On approaching Halfya, three forts opened fire on each bank, being quickly silenced by the overwhelming fire of the gunboats, and then occupied by the friendly Arabs.

Submarine mines were reported as laid down off Halfya, and others abreast of Tuti Island; one was undoubtedly in position between Tuti Island and the right bank of the river, with a wire led in to the shore each side. It was apparently sunk to the bottom, and should have been fired by pulling the wire on Tuti Island, but apparently no attempt was made to do so.

The forts at Omdurman kept up a fairly heavy, but ill-directed fire. The flotilla stopped on the right bank, just abreast of the North end of Tuti Island, where the howitzer battery was landed. As the range from this position to the inland part of Omdurman was rather great for the effective bombardment by the howitzer battery, an attempt was made to find a suitable place on Tuti Island. The flotilla proceeded in line ahead round Tuti Island, with the flagship leading; while the forts at Omdurman and Khartoum fired to the best of their ability. From the latter place the Dervishes made their best practice, as the guns, being well hidden in a dense grove of palms and undergrowth, were very hard to silence.

Tuti Island being little more than a swamp at high Nile, it was impossible to land the howitzer battery, so it remained on the right bank, and bombarded Omdurman from there, the range being about 1600 yards to the Omdurman forts, and a little over 3000 to the Mahdi's Tomb. The howitzer battery being safely landed, the gunboats returned to the army encamped at Kerreri, leaving the Tamai and Nassr off Omdurman to guard the battery.

Battle.

During the battle of September 2 the gunboats guarded the left flank of the army, doing great execution on the dense masses of the enemy. When the camel corps were hard pressed, some of the gunboats were able, by dropping down stream, to turn back a large mass of Dervishes coming round Kerreri Hill. The 12-pr. shrapnel shell burst with the greatest accuracy, and the cross fire of gunboats from the river and artillery from the land had, in addition, a great moral effect. As the victorious army advanced, the gunboats pushed on, and about 5 o'clock in the evening went alongside the walls of

Omdurman, helping to silence the fire that was still going on from the houses near the river.

At 8 o'clock that evening the pursuit up the White Nile commenced. There was a full moon, so it was possible to push on up the unknown river. The river there, as is always the case at high Nile, had overflowed its banks, and just above Omdurman was in places over two miles wide, though it was never navigable across its entire breadth. On either side trees and bushes were growing out of the water. It had been hoped that the gunboats might have assisted in the pursuit of the Khalifa, but it was soon found that the state of the river rendered this impossible, as it was very seldom that the gunboats could get anywhere near dry land on the left bank. It was evident that no force could march close to the river, as in places the country was a marsh for miles. After continuing for one hundred miles or so in hopes of finding a more approachable left bank, and finding none, the gunboats returned to Omdurman. Pursuit.

Shortly after the return of the gunboats from their pursuit up the White Nile, a small Dervish steamer arrived down off Omdurman early one morning flying white flags. On being boarded the Reis in charge reported that he was fired on by white men at Fashoda, and in proof of it produced some modern nickel-plated bullets of small bore, evidently European. There was thus no doubt that an exploring expedition had arrived at Fashoda, and opinions were divided as to the nationality. Trip to Fashoda.

On the morning of September 10 the Sirdar left Omdurman, flying his flag on the Dal. The flotilla consisted of the Dal, towing barges containing an Egyptian Field Battery under the command of Major Peake, R.A.; the Nassr, Lieutenant Hood, towing barges with the 11th Soudanese Battalion under the command of Major Jackson; the Fatteh, Lieutenant Beatty, towing barges with the 13th Soudanese Battalion under the command of Lieutenant-Colonel Smith-Dorrien; and the company of the Cameron Highlanders commanded by Captain Murray; while the Sultan, Commander Keppel and Lieutenant Cowan, and the Abu Klea, Lieutenant Newcombe, R.E., completed the flotilla.

The White Nile was then at its height and was very broad; it was a simple, easy river to navigate; there appeared to be no rocks, and there were then very few sandbanks. The chief difficulty was to keep up the supply of wood quickly. The steamer of the Nassr class, towing barges, required about 30 cwt. an hour, or, if the wood was very bad, as much as 35; and especially near Omdurman it was difficult sometimes to find suitable places to stop to cut, partly owing to the scarcity of trees, and partly owing to the impossibility

in so many places of approaching close enough to the bank, owing to the reeds, bushes, &c., growing in the water. A start was usually made at five o'clock in the morning, and at five in the evening a good place was selected to stop. All hands were landed at once, and as much wood as possible was cut till dark, and the food for the next day cooked. If there was then not sufficient wood cut, the men were again landed from four till five in the morning. In this way progress of forty to sixty miles a day was made. There were a few villages containing an Arab population; they appeared very poor, and there was little sign of cultivation.

On the night of the 11th the flotilla stopped late at night off the large town of Ed Duem. It stood some way back from the river, and was entirely of pointed straw huts, much the same shape as a beehive. There was a large population, who came to welcome the Sirdar, and also produced for sale a few fowls. It was from this town that Hicks Pasha started on his ill-fated expedition against the Mahdi, which ended in his own annihilation near El Obeid.

On the 12th the large town of Kawa on the right bank was passed, and towards evening the island of Abba was reached. It was here that the Mahdi took up his residence and commenced his religious campaign.

On the morning of the 15th, about 300 miles south of Khartoum, the Dervish steamer Safia (the steamer in which Lord Charles Beresford effected the rescue of Sir Charles Wilson, etc.) was found secured to the right bank of the river close to a Dervish encampment. As the flotilla approached, the Sultan (which had no barges in tow) was sent on ahead. The Dervishes opened fire from a gun on shore and from rifles. A few shrapnel shell and some Maxim fire from the Sultan cleared the camp and sent the Dervishes in headlong retreat, the 11th Soudanese being landed to clear the camp. The steamer was in a very disabled condition and could not move. No guns were on board, but there was a good supply of fire-wood, of which she was instantly relieved. The flotilla proceeded on about noon, leaving the old steamer to be towed down on the return voyage. The river still remained very broad, with much vegetation. As a rule, a deep belt of reeds fringed the banks and rendered an approach to dry land impossible. Hippopotami abounded; it was not uncommon to see nine or ten together, though they never came very close to the gunboats. There were crocodiles, some very large; one that was asleep on a sandbank, and allowed the gunboats to pass fairly near, must have been at least four feet broad. On shore there were small monkeys, bustard, and guineafowl, and a large number of hartebeest were seen; but in most places the country was so thick

that it was very hard to see anything from the river; and on shore it was difficult to get very far, as the jungle was very thick, and the only paths were those made by the hippopotamus. Mosquitoes and all insects were very tiresome, and especially the serût fly, which drew blood with a sharp sting that went through a shirt and was extremely painful.

Arrival at Fashoda.

On the 16th the flotilla arrived at Kaka, a large Shilluk town about seventy miles from Fashoda. Several of the gunboats had been delayed for wood, but all arrived during the night and early morning. On the afternoon of the 18th a halt was made for the night about ten miles below Fashoda, and a letter was sent on notifying the post there of the approach of the Sirdar. At eight next morning a start was made, and when about five miles off Fashoda a boat with a French flag was seen approaching. It contained one of Major Marchand's officers, and was pulled by six Senegalese blacks. The boat went alongside the Dal and was taken in tow. As Fashoda was approached the French flag could be made out in the middle of the small native village, and near the old Egyptian fort the force of Major Marchand was drawn up to receive the Sirdar. The river opposite Fashoda was divided up into channels; the actual main stream did not run past the town, but was separated from it by a big island of reeds; the channel past the town was very narrow, not more than 50 ft. wide, and in anticipation of a Dervish attack had been closed in with reeds, etc., to keep the steamers out, and was only opened up on the receipt of the Sirdar's letter. The Sultan ran in under the old Egyptian buildings and secured to the bank. Major Marchand and an officer came down to receive Commander Keppel and Lord Edward Cecil. The Dal, following closely, stopped near the Sultan, when Major Marchand and his officer went on board to see the Sirdar, who remained with them and Colonel Wingate in conference for about three-quarters of an hour. Meanwhile the other steamers had secured close to the French post. The garrison were lining the work, and consisted of about 100 Senegalese with repeating rifles, and a number of Shilluks with their native spears.

Advance to Sobat.

When the conference was over, the steamers proceeded on up stream about 300 yards; the troops were landed, and paraded; the Egyptian flag was hoisted and a salute of twenty-one guns fired. The 13th Soudanese then at once re-embarked, and the whole flotilla proceeded on to Sobat, except the Nassr that remained at Fashoda with the 11th Soudanese and two guns under Major Jackson. Many Shilluks came in at once to fraternise with their friends in the battalion. The flag was hoisted at Sobat, the Abu Klea remaining there with part of the 13th Soudanese. The Sultan remained at

Fashoda, and the rest of the steamers returned to Omdurman without further adventure. The climate was very bad and unhealthy, it rained nearly every night, and the mosquitoes and insects were very bad.

General remarks.

There is no doubt that the moral effect of the gunboats was very great; the Dervishes had nothing to put against them on the river, and they never knew when their boats were safe. During the year preceding the advance, while they still occupied Metemmeh, they kept their boats above the forts; but the three gunboats of the Zafir class ran the gauntlet of the forts and captured them. They got more boats down from Omdurman, built more forts, in positions nearer to the bank; but with the same result. It is said that Mahmud was so impressed with these gunboats, that when he advanced on the Atbara (which ended in his defeat) he gave especial orders that they were not to be damaged by shell fire or altered in any way, as they were his, and he wanted them just as they were. Whether the officers and crew were to be left just as they were or not, was not stated.

Forts v. gunboats.

When steaming past the forts the range at its lowest was only 50 to 150 yards, but the rapid and accurate fire from the gunboats undoubtedly kept the Dervishes from aiming properly, and though several shell entered the gunboats on various occasions, the engines and boilers were never vitally injured. The effect of the gunboat fire on the sand forts was also trifling as far as real damage was concerned, as the Dervishes built their forts very thick and with very narrow embrasures; but as every shot hit the fort somewhere near the embrasure, it was seldom that very much was visible from inside, due to the clouds of dust and smoke. Baggara Emirs were stationed on each fort to keep the gunners (usually Egyptian prisoners) to their guns; any man attempting to leave was killed. It was stated that Mahmud gave a wife to any man who got a shell into a gunboat.

The Dervishes never attempted systematic sniping; had they done so, they could on many occasions have made matters unpleasant. At low Nile, the gunboat on patrol was often ashore on the numerous sandbanks, and the Dervishes should certainly have tried to annoy the gunboat on these occasions. They appeared to be greatly afraid of the Maxim guns, and in places where riflemen were awaiting the gunboat, they frequently did not fire when quite close (usually about 20 yards), but waited a little, and the bullets usually flattened themselves on the plates at the stern. No attempt was ever made at night to rush the gunboat, though at low Nile it was often necessary to secure to an island which was easily fordable from one bank or the other.

The Dervish shells were, as a rule, about 9-prs. with studs; there was a wooden percussion fuze in the head, but as a rule the shell broke up and did not burst explosively. They also had a time fuze, but the shells did not often burst in the air.

There is no doubt that full use was made of the steamers in the final transport of troops and stores. The army had not sufficient camels to move by itself, and at each halt, even in the final stages of the campaign, the transport animals were reloaded from the boats towed by the steamers. The howitzer battery and the 40-prs. could not have been brought to the front in any other way.

Gunboats as transport.

It may be of interest to see how many camels would have been required to do the work of one steamer of the Zafir class. While the heavy transport of troops and stores was going on, the time that the steamers took was three and a half days to go 130 miles and back, and each steamer carried, in addition to the troops and her own stores, about 75 tons of stores (divided among steamer and barges). Roughly, seven camels carry a ton, and to go 260 miles would require at least ten and a half days, therefore it would have required $75 \times 7 \times \frac{10\frac{1}{2}}{3\frac{1}{2}} = 1575$ camels to do the work of one steamer of the Zafir class. Now this work had to go on without ceasing for a month, so that at least 2000 would have been required, if indeed it could have been done at all, at such high pressure, by camels. Also, if the numbers of camels increased, the transport of their own forage increased, which would have been very considerable when it came to a question of many thousands.

In conclusion, it was unfortunate that the Dervish steamers did not, as was once reported, show fight, as a second and small edition of the Battle of the Nile would have been a nice termination to the work of the gunboat flotilla in the Omdurman campaign.

CHAPTER IX.

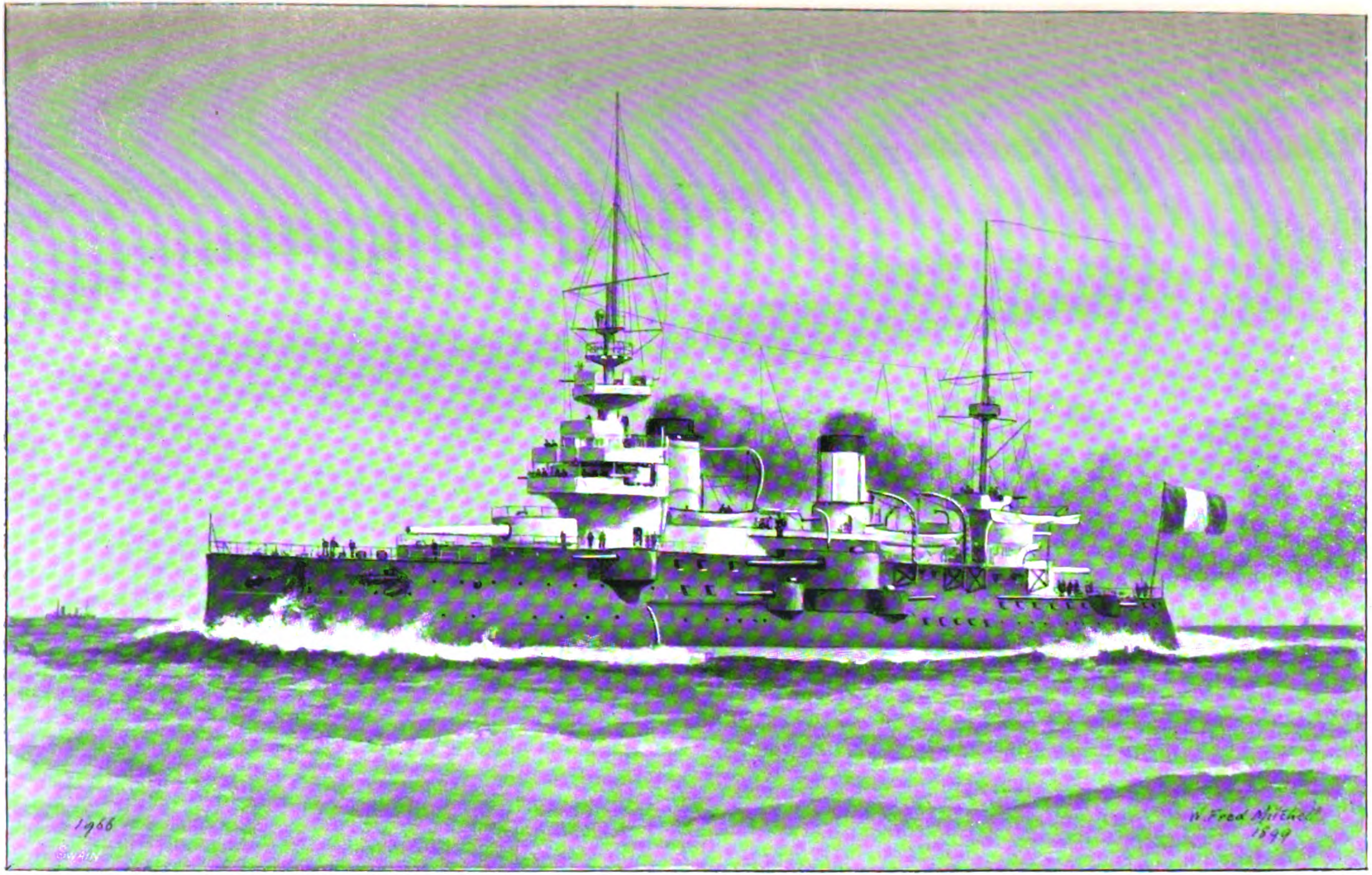
Naval Manœuvres.

France.

Several circumstances contributed to draw a good deal of attention to the French naval manœuvres of 1898. Our own manœuvres had been suppressed, and M. Lockroy had but just assumed office with rather pronounced views, and had immediately given a great impulse to naval movements. The summer had been well filled with practical work, and the manœuvres in July were but the crown and completion of a series of minor operations in which the squadrons had been engaged. Thus in May, when the Mediterranean Squadron was in Corsican waters, the Marceau, 10,881 tons, entered the long rocky defile which leads to Bonifacio, demonstrating the practicability of the port for a squadron. The ships afterwards passed through the Straits of Bonifacio at night with masked lights, in order to exercise the torpedo-boats of the squadron and the mobile defence in distinguishing friends from enemies. No mistakes were made. On the return from Ajaccio in the beginning of June there was a manœuvre based on the idea that an enemy was about to attack Marseilles. The cruisers were to gain contact with him, and to give intelligence to a defending squadron.

Experimental mobilisation at Toulon.

On June 10 there was an exercise of partial mobilisation of the sea and land forces, on the occasion of an attack on the forts and batteries of Toulon. Early in the morning Vice-Admiral de la Jaille, naval prefect, in the capacity of military governor, issued the order for mobilisation, whereupon the troops turned out, and at 6 A.M. a telegram was despatched to the signal and other stations, announcing that an enemy was expected, and that preparations must be made for the defence of the coasts, including the Iles d'Hyères. Upon the orders of Rear-Admiral Châteauminois, major-general, all the available torpedo-boats were commissioned, while the director of submarine defences doubled the *personnel* of the forts at Saint Tropez and La Ciotat, and the boats of the mobile defence got under steam. At the same time the medical staff was organised, and within a few hours after the order for mobilisation everything was pronounced to



"BOUVET,"
FRENCH BATTLESHIP.

be ready. At 1.30 P.M. the second division of the attacking squadron from La Ciotat (Brennus, Carnot, and Jauréguiberry) appeared, and, exchanged a vigorous cannonade with the forts of Carqueiranne, Sainte Marguerite, and Cape Brun, while half an hour later the first division was engaged with the Croix des Signaux, the Grosse Tour, and the Caraque, which compelled it to retire. At 3.15 the united squadron reappeared in line ahead, the Brennus leading, and the reserve division in the rear. All the batteries opened fire upon the advancing ship, but the manœuvre squadron changed course under Cape Cépet, while the reserve division ran past the batteries into the harbour under a tremendous fire, the Amiral Duperré and Chanzy being torpedoed. A third attack was made at 9 P.M. with considerable expenditure of ammunition, all the torpedo-boats being manned, while the fixed defences had fifteen search-lights and five lines of dummy mines in readiness.

The Mediterranean manœuvres. First period. The Mediterranean Squadron and reserve division, with complements completed by the mobilisation of reservists, was under command of Vice-Admiral Humann during the manœuvres in July. The combined force was thus composed: battleships (10), Brennus (flag Jauréguiberry, Carnot, Magenta, Charles Martel (flag of Rear-Admiral Dieulouard), Formidable, Neptune, Marceau, Amiral Duperré (flag of Rear-Admiral Godin), and Amiral Baudin armoured cruisers (2), Latouche-Tréville and Chanzy; cruisers (7), Foudre, Cassard, Lalande, Lavoisier, D'Assas, Condor, and Milan; torpedo flotilla, the torpedo-gunboat Lévrier, with the sea-going boats Flibustier, Forban, Kabyle, Sarrazin, Eclair, Orage, and Chevalier. The preliminary period of the manœuvres was from July 5 to 8 at the Salins d'Hyères, and included a successful experiment in coaling under way with the Temperley apparatus in a rough sea from the collier Japon, as well as manœuvres with a balloon towed by the Foudre, pigeon flights, and operations of the torpedo flotilla.

Second period. The second period of the operations opened on July 8, when the squadron left Hyères for Tunisian waters. Bizerta was reached on the morning of the 10th, and Admiral Humann passed through the channel to the lake with fourteen large vessels and eleven smaller of his squadron, while the reserve division, under Rear-Admiral Godin, including the Duperré, Baudin and Formidable, proceeded to La Goulette. On July 13 the Commander-in-Chief, accompanied by Rear-Admirals Dieulouard, Godin and Michel, visited Tunis, to be decorated with the Order of Nicham Iftickar by the Bey. At a banquet he referred to the visit of the squadron to Bizerta, and remarked that it was not without a purpose, for it marked a new state of things, inasmuch as France would soon have a first-rate naval

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base at the port. The French took formal possession of the place in 1885, when Vice-Admiral de la Jaille, to use his own phrase, "broke the spell, regardless of certain susceptibilities which up to that time had been considered."

Third period.

For the third period of the manœuvres (July 15 to 20), Admiral Humann, leaving Bizerta, proceeded with the Brennus, Magenta, Marceau, Neptune and Jauréguiberry, to Ajaccio, where he arrived at mid-day on July 17, and during the two following days the vessels were proceeding to their several stations in readiness for the *manœuvres à double action*, which began on July 20.

The enemy's squadron, "B" (Rear-Admiral Godin), with a maximum speed of 10 knots, coming from the eastern basin of the Mediterranean, menaced the coasts of Provence, Algeria and Tunis, and might approach at will between Galita and Cape Spartivento, or by the Straits of Bonifacio, or between the Island of Capraja and Cape Corso. Under the rules he might not run through the southern passage after 8 A.M. on July 21. To succeed in his purpose the Rear-Admiral must remain during twelve daylight hours, separated, if need were, by a night, before the place menaced. The defence was entrusted to a squadron "A" (Vice-Admiral Humann), also with a speed of 10 knots, to a light squadron, "A L," composed of ten cruisers steaming at from 14 to 17½ knots (Rear-Admiral Dieulouard), and to the various mobile defences.

It was anticipated that the enemy would appear off the southern end of Sardinia, but as he did not do so by the latest hour prescribed, squadron "A" stood to the north at 10 knots along the western side of the island, the cruisers stretching ahead. The enemy meanwhile passed through the Straits of Bonifacio at 3 P.M. on the 21st before the cruisers could come up with him, but he had been observed by the boats of the mobile defence, and these, after informing the signal stations, followed him. When the first of Rear-Admiral Dieulouard's cruisers reached Asinara, off the northern end of Sardinia, she received intelligence of what had happened, and soon gained touch with the pursuing torpedo-boats. The other cruisers came on at intervals of about ten miles, being directed by signal rockets, and the result of the operation was that, at daybreak on July 22, the battle squadrons were but thirty miles apart, making it impossible for the enemy to fulfil his purpose under the rules before the close of the operations on the 25th.

The whole interest of the manœuvre had depended upon the gaining and maintaining touch with the adversary, and the new scheme of grouping the cruisers in a division under their own flag-officers was under trial. The scouting and signalling arrangements

answered admirably, notwithstanding the excellence of Rear-Admiral Godin's plans; and it was concluded that the service was in an efficient state to resist, or at least be prepared for, such a movement as had been designed. Vice-Admiral Humann, in his order of the day at the close of the manœuvres, expressed his high satisfaction with the manner in which the various exercises had been gone through, and with the good training and conduct of the men.

Rear-Admiral Godin had judiciously chosen to enter the western basin of the Mediterranean by the Straits of Bonifacio, thus holding the advantage of any indecision in the handling of the defending cruisers, or of any gap in the chain of communications, while he retained the possibility of menacing the coast either of Algeria or France in conditions which might have led to the loss of contact on the part of the pursuers, and have caused disorder in their plans.

Rear-Admiral Dieulouard's light squadron, however, had been handled with decision, particularly in the matter of gaining and keeping touch with the assailant, and the engineering *personnel* had shown the best qualities. The plan of grouping the cruisers under a flag-officer has since been definitely adopted in the Mediterranean Squadron. Vice-Admiral Humann also had high praise for the Lévrier and her torpedo-boats, and for the boats of the mobile defence, for the ability with which the transmission of the intelligence gained at Lavezzi was organised, and for the decision and endurance which were displayed in the pursuit of the enemy.

The Channel manœuvres.

The Northern or Channel Squadron, which has since, like that in the Mediterranean, been re-organised, was composed during the manœuvres as follows: battleships (5), Masséna (flag of Vice-Admiral Barréra), Jemmapes, Valmy, Bouvines (flag of Rear-Admiral de Penfentenyo de Kervéréguin), and Amiral Tréhouart; armoured cruisers (2), Dupuy de Lôme and Pothuau; cruisers (4), Catinat, Surcouf, Epervier, and Cassini; torpedo-boats, Mangini and Aquilon. The early operations generally resembled those in the Mediterranean, and had been preceded in the same way by scouting and other tactical exercises, of which the most important was the successful forcing, by the Surcouf and nine torpedo-boats, of a blockade established by four battleships and a cruiser of a squadron supposed to be lying in Douarnenez Bay. The Surcouf and her companions completely eluded the vigilance of the blockaders between the hours of 10 and 11 P.M. on a dark night in July.

Forcing the Goulet of Brest.

The most striking episode of the manœuvres was the forcing of the Goulet of Brest. Interest was directed chiefly to the visit of M. Lockroy and to the operations which took place at and near that port in his presence. He had desired to make the

manœuvres in the Channel a salutary lesson for the creation of a strong body of public opinion; and with that purpose, for the first time, the representatives of the Press were invited to witness the operations. It had long been feared that the dual system of control of the coast defences might operate disastrously in case of war. The story is an old one. When Cornwallis was blockading Brest in 1803–4, Caffarelli, the naval prefect, was continually complaining to Decrès that the coast batteries were under-manned, and rendered little help when our frigates and boats were cutting off the French gun-vessels and coastwise traders. It was asserted at the time of the manœuvres that the coast batteries could not be fully manned until nearly a week after mobilisation, and the result, combined with the mobilisation of which the Fashoda incident was the immediate cause, evidently demonstrated the deficiency so plainly as to give M. Lockroy a strong case for demanding a re-organisation of the system of defence. A large increase in the number of troops in the forts of the Goulet and the batteries in the Island of Ushant has since been made. Much had already been done within recent years to perfect the defences of the Goulet. Many telephonic and telegraphic lines of communication had been provided, telemetric apparatus had been supplied to the batteries, and a number of search-lights had been installed, and it was largely to test the working of these that the double forcing of the Goulet was effected.

The following account of what occurred is from an article by a correspondent of the *Times*:—"The operation took place on August 4, M. Lockroy watching it, with Admiral Fournier, naval prefect, from the top of the Miniou Fort. Admiral Barréra was in command of the squadron, which consisted of the Masséna, Tréhouart, Valmy, Bouvines, Dupuy de Lôme, Surcouf, Pothuau, Catinat, Epervier, and Mangini. The squadron approached in two columns, line ahead, at 12 knots, one column taking the northern and the other the southern passage, and engaging the forts and batteries as they came. The Goulet was filled with the smoke from the guns and the air rent with the din, but everything passed off well, the ships reaching their moorings in less than an hour. In order that no disaster might occur during the night attack great precautions were taken, the shore lights being kept burning and no torpedo-boats being allowed to remain in the passage. The work of the assailants was thus greatly simplified. The formation on this occasion was a single column in line ahead, the Masséna leading and the Catinat closing the line. The engagement opened at ten minutes to 10 at night and was conducted without a hitch. The beams of a multitude of search-lights penetrating and illuminating the dense volumes of smoke, and the roar of the guns

reverberating in the Goulet, made the event most impressive; and no doubt the detailed and confidential report on the firing will enable a decision to be made as to the efficiency of the elaborate system of defence devised."

The last important operation of the Channel manœuvres was a disembarkation of marines near Douarnenez, in face of a strong force of infantry and marine troops with six guns under command of General Dodds. After a bombardment of the shore by the heavy guns of the squadron, the ships' boats, filled with marines, were towed towards the beach by steam pinnaces, each with a machine gun in the bows, the Mangini and Epervier approaching to protect the landing. When the water began to shoal the boats were cast off and rowed to the shore under a heavy fire. The men then jumped out, many of them getting up to the neck in water, but all were safely landed and formed up on the beach. From such an operation little can be learned. Its purpose was to train the men and, as was said, to rehearse with improvements the operations of Santiago de Cuba. Landing near Douarnenez.

Germany.

The German manœuvres in August resembled in many particulars those of the previous year. Greater general interest was taken in them than was formerly the case, owing to the larger place the Fleet occupies in the public mind. At the same time intelligence concerning the manœuvres was not readily divulged, and the following account of what occurred is taken largely from the *Neue Preussische Kreuzzeitung*. Vice-Admiral Knorr, as director of the manœuvres, had again his flag in the Blücher, with a torpedo-boat as tender for despatch purposes, and the Fleet was organised as follows, in two squadrons:—

The squadrons.

First Squadron (Vice-Admiral Thomsen)—
- First Division: battleships, Kurfürst Friedrich Wilhelm (flag), Wörth, Weissenberg, Brandenburg; despatch vessel, Greif.
- Second Division: battleships, Baden (flag of Rear-Admiral Bendemann), Bayern, Oldenburg; despatch vessel, Hela.
- Torpedo Flotilla: division boat "D 9"; Division "A"—"D 4," Nos. 82, 83, 84, 85, 86, 87; Division "B"—"D 8," Nos. 67, 68, 69, 70, 71, 72, 73; depôt ship, Pelikan.

Second Squadron (Rear-Admiral Hoffmann)—
- Third Division: coast-defence armourclads, Ægir (flag)—with division boat "D 3" as tender—Odin, Hagen; despatch vessel, Pfeil.

Fourth Division: coast-defence armourclads, Frithjof (flag of Commodore Geissler), Beowulf, Heimdal; despatch vessel, Blitz.

Torpedo Flotilla: Division "C"—"D 6," Nos. 7, 8, 9, 10, 11, 12, 13; Division "D"—"D 8," Nos. 15, 16, 17, 18, 19, 20, 21.

Third (Training) Squadron (Captain von Maltzahn): Stosch, Charlotte, Moltke; armoured gunboats, Mücke, Natter.

Operations in the Baltic.

The first period of the manœuvres, consisting of operations in the Baltic, began on August 15 and lasted until the end of the month. The two squadrons, after engaging independently for two days in steam tactics, were united, and continued the same work. On August 22 the Ægir and the training squadron, representing an enemy, were engaged in blockade tactics off Kiel, and, when the ships had coaled, the squadrons parted to enter upon the strategic portion of the programme. Essentially this differed in few particulars from the scheme laid down in 1897, though the incidents and developments were different. Rear-Admiral Hoffmann, with the bulk of the second squadron, and with the second torpedo flotilla, assigned for scouting purposes, took the place of the enemy. An obvious analogy is suggested. His squadron represented a Russian fleet from Cronstadt, and was to endeavour to join forces with a French squadron which had entered the Baltic from the west, while the German Fleet, represented by the first squadron, reinforced by the Hagen and Beowulf, and with eight scouting vessels, under Vice-Admiral Thomsen, was to use every effort to prevent the juncture. The area of operations lay between the meridian of Arcona and a line drawn from the island of Bornholm to Adlergrund, and it was an instruction to Rear-Admiral Hoffmann that he should avoid a general engagement. He completely failed in his chief purpose. Arriving off Hela on August 24, he proceeded westward, but was sighted on the next evening by the German cruisers. These were engaged by his torpedo-boats (two of which were pronounced to be lost), and the Rear-Admiral seized the opportunity to elude his observers. It was but a temporary success, for he was soon sighted again, whereupon, seeing the hopelessness of the attempt to shake off his adversaries, he returned to Hela, where he was blockaded. The triumph of the cruisers was complete, and was accepted as a new demonstration of the great necessity for adding vessels of the cruising class to the German Navy. The united squadrons proceeded from Hela to Neufahrwasser to coal, and arrived at Kiel early on September 1. Very heavy weather was encountered on the passage, which drove the torpedo-boats to

seek shelter, though one of them, No. 85, was lost off Fehmarn Island, being completely swamped. The crew were saved.

Passage of the Kaiser Wilhelm Canal.

Leaving Kiel, to enter upon the second period of the manœuvres, the whole force passed through the Kaiser Wilhelm Canal within the space of eighteen hours, and was off Heligoland on September 2. This was a very remarkable performance, and completely confirmed the strategic value of the canal. Single torpedo-boats traverse the canal in about 6½ hours, gunboats in 7 hours, and a small torpedo flotilla in about 7½ hours, while the coast-defence ships require 8 hours, and large cruisers and battleships from about 10 to 13 hours. The locks are passed through by torpedo craft in about 7 minutes, and by battleships in about a quarter of an hour.

Operations in the North Sea.

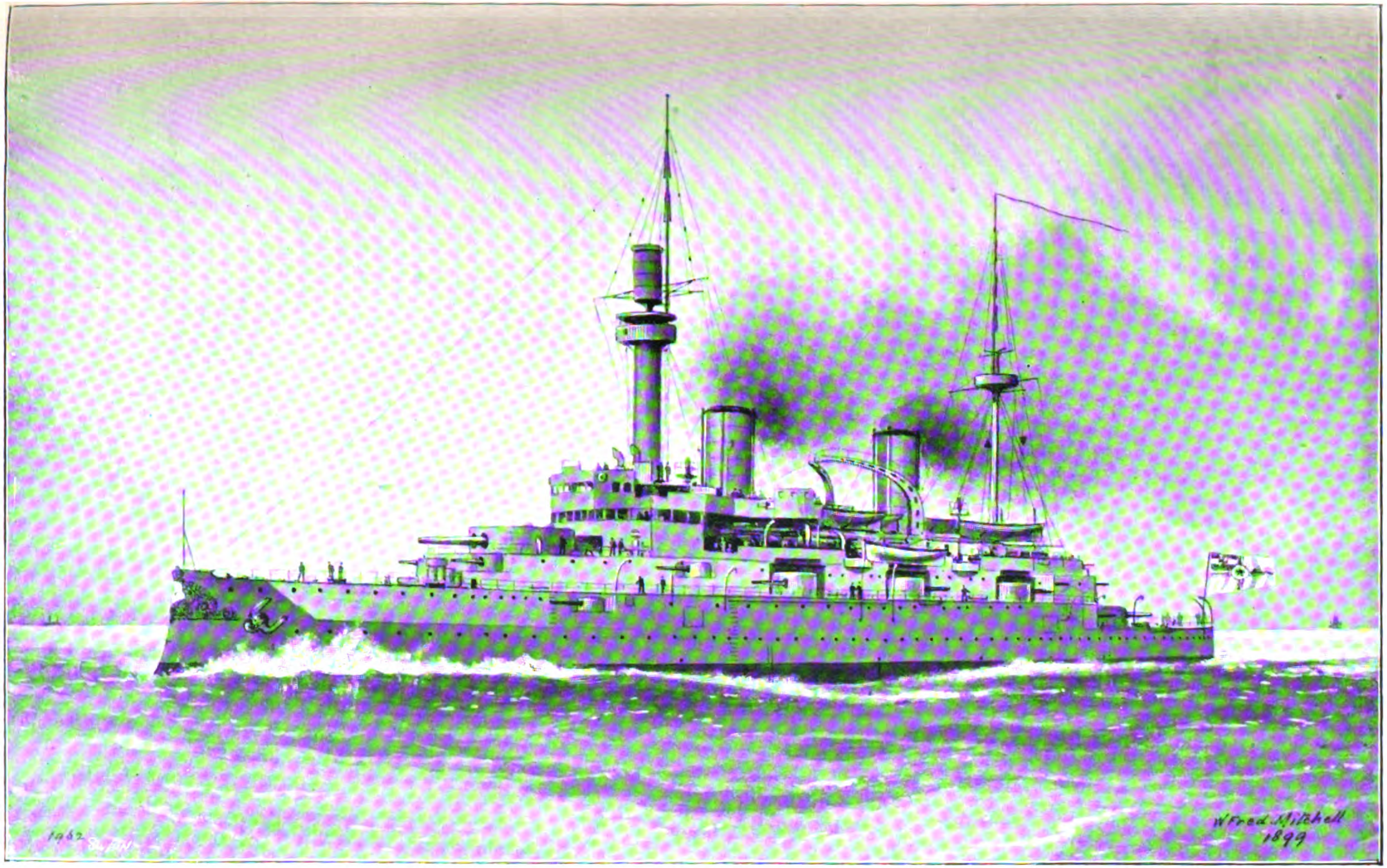
In the plan of operations laid down for the North Sea manœuvres, the defending (or German) fleet had been defeated and driven to port, and the enemy had command of the sea. Vice-Admiral Thomsen was now in command of the attacking (or Yellow) force, and had with him his own division and those of Rear-Admirals Bendemann and Hoffmann, as well as the torpedo transport and a flotilla composed of one division boat and three others. He was to make an attack upon the Jahde Bucht, upon which Wilhelmshaven lies, and upon the mouths of the Weser and the Elbe, the defence being entrusted to Vice-Admiral Karcher, commanding at Wilhelmshaven, who had with him the Frithjof, Beowulf, Heimdal, and Carola, rated as battleships, as well as the gunboats Mücke and Natter, the storeship Grille, and a torpedo flotilla. All the signal stations, forts, and batteries were fully manned, and the Vice-Admiral stationed his battle division, with the Grille, at Cuxhaven at the mouth of the Elbe, the torpedo flotilla in the Weser, and the coast-defence ships in the Jahde.

The precise value of the operations that followed as representative of actual warfare seems doubtful. The Yellow commander, having found no trace of his defeated adversary along the Schleswig-Holstein coast or at Heligoland, was considered to have cut the cable between the island and the mainland. He established a blockade, and on September 13, the second division being off the Jahde, Rear-Admiral Bendemann sent in the Oldenburg, with the Pelikan, to attack the ships and forts. They were ruled out of action, the attempt having been made with insufficient force considering the strength of the position. Rear-Admiral Hoffmann, with the third division, raided the mouth of the Weser, but failed to discover the torpedo-boats, the destruction of these being his principal object, though the weather was favourable, but he succeeded in destroying some of the signal stations and smaller posts. These operations having

been almost fruitless, the Yellow commander proceeded on September 15 with the whole of his force to attack the outer fortifications of Wilhelmshaven. At night, in order to avoid danger from the defending flotilla, he steamed out to sea, returning in the morning to resume his attack. The next night again he withdrew, having lost four battleships by the decision of the umpires; but instead of steaming to sea came to an anchor, according to the *Neue Preussische Kreuzzeitung*, outside the range of the guns of Wilhelmshaven on the north side. The defenders were on the alert, and this gave their torpedo-boats an opportunity. The boats stole out in the night to make an attack, but were discovered, and this operation, which was attended by great confusion, brought the manœuvres to a close.

What measure of success would have attended such an attack in actual warfare it is impossible to say. The boats were under a heavy fire from the guns of the battleships, and some of them at least would have been destroyed. Any semblance of reality that existed in the operations seems, however, to have been destroyed by the fact of the Yellow commander anchoring at night in a place of conspicuous danger. He had, moreover, commenced badly, as appears by the details furnished by the *Kreuzzeitung*, by dividing his force and losing ships through ill-supported attack. Further the whole policy of attacking forts with ships is open to grave question, and the decision of the umpires to rule four battleships out of action as a result of the two days' engagement marks the serious view they took of it. Probably, however, the purpose was rather to give some practical training to officers and men in the ships, torpedo-boats, shore batteries, and signalling stations than to reproduce the exact conditions of an operation of actual war.

JOHN LEYLAND.



"KAISER FRIEDRICH III."
GERMAN BATTLESHIP.

CHAPTER X.

MARINE ENGINEERING.

Lessons from the Spanish-American War.

DURING the past year the eyes of British naval engineers have been turned chiefly westward for instruction—to those distant waters where hulls and engines, boilers, armour-plates, and guns have been put to that ultimate use for which all warships are designed, but which so few are destined to serve. Since we last wrote, the ships of Spain and America have become war-vessels by deed as well as in name. In this chapter we speak only of the engineer, and for him there is less of the exhilaration of battle than for the executive branch of a naval service, though perhaps a fuller measure of nerve tension. The general strategical lessons of the war are dealt with comprehensively elsewhere, but it may be that the chief, both in strategy and tactics, will be found to be those which are to be gathered from the engine-room when the full history comes to be written. One great feature of the war was the voyage of the Oregon from the Pacific Coast to the scene of hostilities. This was an engine-room triumph. All successes in battle were scored by the Americans; but, though there was plenty of gun-firing at times, the reply from the Spanish side was so ineffectual that these operations generally approached naval manœuvre quality as nearly as anything of the kind could do. Constructor Hobson's gallant endeavour to bottle up the Spanish fleet by sealing the passage to Santiago was a piece of heroism worthy of the best traditions of any navy, and was calculated to appeal strongly to the popular imagination, as events have since fully proved. But the voyage of the Oregon revealed in the engine-room staff those qualities which have always been characteristic of our own race, and especially of our Navy, and to which its greatest successes have been due. The engineering staff of the Oregon must have carried out their routine duties thoroughly and conscientiously or the ship would not have accomplished what she did, and it is the unostentatious performance of duty for duty's sake that is at the root of naval efficiency. It is a hum-drum virtue, perhaps, but most useful. Nelson's fearlessness and contempt of death were never more apparent than during his greatest failure, the disastrous attack on Teneriffe, and it was his heroism that led him

to make that attempt. But it was his dogged perseverance, his unwearying attention to detail, especially displayed when cruising off Toulon, that put those "storm-tossed ships" into that state which gave him the crowning victory of Trafalgar.

Duties of the engineering staff.

These somewhat abstract speculations would be beyond the mark in the present chapter, almost necessarily a prosaic one, were it not that the qualities referred to should be more especially characteristic of the engine-room staff of a modern war-vessel. Just as every spar and sail and rope were tested and made good by the long vigilant watch off Toulon, so should the wonderfully complex mechanism of a modern warship be so well proved by the engineering staff that failure, when the hour of battle arrives, may be as remote a contingency as human foresight can make it. It is the chief engineer on whom the responsibility for all this falls. In our Navy, he and his subordinates have the care not only of engines and boilers, but of all other mechanical appliances, the hull as well as the machinery; the double bottoms, watertight doors, gun mountings, machinery for loading and working guns, for supplying ammunition and for turning turrets on barbette platforms; of the torpedoes, with their carriages and discharge tubes; all the numerous auxiliary engines, air compressors, windlasses, steering engines, winches, and gear of all kinds by which almost all the operations in peace and war are carried out in a modern war-steamer. Occasionally, during this long era of naval peace in which we still live, we get a glimpse of how well these duties are carried out, as when the Calliope steamed out of Samoa, trusting to her engines, just as a ship of Nelson's fleet might have clawed off a lee shore seaward, trusting to honest work in sails and rigging, as, indeed, most of them had to do often enough.

Water-tube boilers.

During the past year the water-tube boiler has continued to be the most important subject which has engaged the attention of naval engineers, but there has been no mechanical feature like the economiser of last year introduced of sufficient importance to demand any extended notice, especially as the subject has occupied a large proportion of space in the engineering section of *The Naval Annual* during the past three years.

The most interesting point in connection with the water-tube boiler is the fact that the Engineer-in-Chief to the United States Navy has declared in its favour. The fact that the designs of American warships continued to include shell boilers was a forcible argument for some time brought forward against the water-tube principle by its opponents. The Engineering Bureau of the United States Navy never experienced the boiler difficulties that afflicted our own Admiralty engineers a few years ago, when the present

Engineer-in-Chief had to take up the burden of troubles which he inherited on assuming his position. For that reason Commodore Melville has not felt the same incentive to hurry in making the change, but he has now made up his mind to endorse Sir John Durston's policy. In his last annual report to the Secretary of the United States Navy he says:—

Commodore Melville's report.

"In the report of last year attention was called to the increase in the use of water-tube boilers in all foreign navies, and the opinion was expressed that sufficient experience had been gained at home and abroad to warrant us in using boilers of this type in all our ships. The occurrences of the past year have served to strengthen this opinion, and the Bureau in its recent designs, except for battleships, has specified this type of boiler."

The report then goes on to explain how it was that water-tube boilers were not specified for battleships. The circumstance, we learn, was due to the fact that the contracts for the ships had been placed on the basis of cylindrical boilers. The Bureau did prepare a design for water-tube boilers, which, as Commodore Melville says, "it was very anxious to use," but it was found impossible to adopt this in the original designs, as "no hull changes would be permitted." The report then proceeds to say:—

"Notwithstanding this temporary postponement of the Bureau's desire that all our new ships should have water-tube boilers, the Department's circular of July 26th, which encouraged builders to submit designs for higher speeds and greater endurance, made it almost certain that water-tube boilers would be secured, inasmuch as the easiest way to accomplish the desired result was by their use, and there was little doubt that the builders when given the opportunity would submit plans for vessels as good as any in foreign navies. The bids which were received on September 1st justified this idea, and although all the bidders did not offer water-tube boilers, it is practically certain they will all install them. . . . At the present day it would be hard to find any design for the machinery of new naval vessels which does not include water-tube boilers. The demands upon the engineer of great power on small weight in order to secure the higher speeds for all classes of vessels which are now common have practically ruled out the cylindrical boiler on account of its weight and inability to carry the high pressures needed."

The tactical advantages of the water-tube boilers are then pointed out in the report, but these are too obvious to need repetition here. Finally Commodore Melville says:

"It thus appears that as the new battleships to be built on the contractors' plans will also use water-tube boilers, we have definitely taken the step of adopting them for all our vessels, and there can be little doubt that the efficiency of the fleet will be increased in consequence."

Commodore Melville speaks of water-tube boilers in general, not specifying any particular type, but in our Navy the Belleville boiler is almost the only description now used for vessels larger than torpedo craft, the exceptions being a few water-tube boilers of other designs, fitted chiefly for experimental purposes. The charges brought against the Belleville boiler have during the last year almost been narrowed down to a low efficiency in fuel consumption. The careful

and exhaustive trials made with Her Majesty's ships during the last two or three years do not bear out this indictment. The 1·71 lbs. of coal burnt for each horse-power exerted for an hour in the Terrible is certainly an excellent record for a naval trial, and we may safely conclude that the performance can be bettered with economiser boilers. In the last issue of *The Naval Annual* some particulars were given of the trials of H.M.S. Diadem. Since then, in the spring of last year, Sir John Durston has read a valuable paper on these trials before the Institution of Naval Architects, giving fuller details than we were able to present. From this memoir we learn that the coal consumption per I.H.P. per hour was 1·59 lbs., as ascertained on a thirty hours' run, the amount of coal burnt being 13·9 lbs. per sq. ft. of grate per hour. On the eight hours' full-power trial, however, when 20·8 lbs. of coal were burnt each hour on every sq. ft. of grate, the coal was only increased to 1·76 lbs. per I.H.P. per hour. During both trials all the boilers were in use, and the steam pressure was nearly the same, being 245 lbs. per sq. in. at the engines during the coal trial, and 249 lbs. on the full-power trial.

Sir John Durston's paper at the I.N.A.

Fuel economy and engine efficiency.

Now it is evident that if 1·76 lbs. of coal are burnt per unit of power on a full-power trial, a better result ought to be reached than 1·59 lbs. when everything is done that can be done to save coal, and no doubt it would be so far as the boilers are concerned. Unfortunately for the boilers, however, they are, when doing their best for economy, handicapped by the engines, more especially the auxiliary engines, but that point will be referred to later. The fallacy of estimating boiler efficiency by coal per I.H.P. has been pointed out formerly in *The Naval Annual*, and the present subject very forcibly illustrates this point. To get the best fuel economy from a boiler it should be worked at slower rates of combustion than would be generally permissible with warships on active service, and after all it is for active service and not coal efficiency trials that warships are designed. Unfortunately the exigencies of active service, especially in vessels like our cruisers, demand such proportions of engines that if the boilers are at their most economical rate of steaming, the engines are using the steam wastefully. This is more fully borne out by the trials of H.M.S. Ariadne, which have, at the time of writing, recently been made. With this vessel on her consumption trial, when 14,046 I.H.P. was being exerted by the engines, the coal burnt was 1·73 lbs. per horse-power per hour, whilst on the full-power trial, when 19,156 horse-power was indicated, the coal consumption actually fell to 1·66 lbs. per horse-power per hour.

The Ariadne's trials.

The results are certainly surprising, but, as they stand, clearly point to the boiler being handicapped by the engines. The figures

are a very good answer to the many critics who condemn the present navy boilers, basing their strictures upon a comparison of mercantile and war-vessel fuel economies respectively. As has been frequently pointed out, a merchant ship is designed to run most advantageously at one uniform rate of power, and that is the power almost constantly given off by her machinery. Fuel economy is an important factor in the total efficiency of the ship; in the case of cargo steamers—and it is the performance of the cargo steamer that is generally brought forward by the critics—a light coal-bill is almost the paramount virtue. Now a war-vessel is designed to fight; no consideration of the coal-bill must be allowed to interfere in this respect, and as speed is one of the chief fighting elements, engines are made big and boilers small in comparison. Big engines are needed to give high power at a pinch, but big engines are wasteful of steam at low powers, chiefly from the enormous amount of condensation that takes place in the cylinders. Low powers are also wasteful on account of increased ratio of friction to useful work, but that does not appear on the indicator cards, so does not affect our present argument. Boilers, of course, are made small to save weight; that is to say, they are small for the power at highest speeds.

The engineer's dilemma.

If we follow the reasoning out we find the naval engineer, who tries to make a good economy trial, on the horns of this dilemma. If he burn his coal slowly so as to give it time to evaporate plenty of water in the boiler, before the heat gets away up the chimney, he only condenses in the engines a good part of the steam generated. That is one horn. The other is that if steam enough be generated to drive the engines economically the boilers are not working at their best fuel efficiency, for too much heat is escaping by the chimney. The judicious engineer will discover which is the best compromise. In the Ariadne it would appear to be full speed and maximum power, which manifestly does not give the boilers a fair chance when they are compared with those working at slower rates of combustion, and with engines designed to give economy at those rates.

Many suggestions have been made to overcome this difficulty and reduce the size of the cylinders to a nearer approximation to what they should be for the quantity of steam passing through them. Two sets of engines have been placed in the same fore and aft line to drive one propeller. This plan was tried in the Italia and the Lepanto, in our own Blake and Blenheim, and in the American New York and Brooklyn. The arrangement has considerable disadvantages, sufficient, in our own Navy, to prevent its further adoption. One great difficulty is to keep the two crank shafts in line. The time taken in coupling up is also a serious drawback

for a warship, as was conclusively proved during the Spanish-American War, during the operations off Santiago, when it was found to be impossible to stop the Brooklyn and New York to couple up the forward engines.

Cutting out a cylinder in a triple-expansion engine and working as an ordinary compound is the same system differently applied, and is open to the same objections. Professor Hollis devised a plan for a light-draught gunboat in which a four-stage compound engine was used with a combination of pipe boilers and shell boilers. At full power all the boilers would be used and the engine would naturally be worked quadruple. The pipe boilers would be pressed to 250 lbs., and would, of course, supply steam to the high-pressure cylinder. The shell boilers would be pressed to 160 lbs., and the steam from these would be taken to the first receiver, passing through a reducing valve. At reduced powers the engines would be worked triple expansion by disconnecting the low-pressure cylinder. So serious is this question of coal economy that Commodore Melville proposed three or four years ago that a number of vessels should be built for the American navy which should be specially designed with low speeds—12 or 13 knots—so that the machinery might work economically at moderate powers. These "men-of-war" were to cruise about in peace time, "showing the flag," and acting as police of the seas, and were actually to be laid up on the outbreak of hostilities. We believe the idea has not been carried out, and indeed, Commodore Melville appears to have found salvation in fuel economy by three screws, a subject we shall deal with later.

In order to obviate the waste of steam due to over-big engines, a plan has been put into operation by which smaller or auxiliary propelling engines are brought into play for low or moderate speeds. This arrangement has long been advocated by Vice-Admiral Makaroff, of the Russian navy, and he has had built a ship of 8000 tons having the machinery arranged on this principle. This vessel, the Ermack, is an ice-breaking steamer built on the Tyne, and has four screws, three being placed aft and one in the bows, the latter of course acting as a pulling screw. The four sets of line shafting have each a triple-expansion mean engine for full-speed work, but there are also four smaller ordinary compound engines, one for each propeller, placed at the side of each shaft respectively and geared to it by spur wheels. When it is required to go at slow speed, the coupling bolts are taken out of the collars of the main shafting so that the larger engines are free. The spur wheels are then put into gear and the auxiliary engines started. The latter are geared down on to the shaft, so that the engines, which run at 150 revolutions per minute, turn consider-

ably faster than the screws, a measure of economy thus being secured by higher piston speed. The vessel is an extremely interesting one in many respects, and as Admiral Makaroff is not only an excellent engineer and conscientious observer, but also an enthusiast in all matters of engineering and scientific research, we may hope to get some interesting data from the extensive series of trials he proposes making.

The steam demands of auxiliary engines.

There are, however, other very good reasons, besides inefficiency of big engines working at low powers, why our warships should not appear to advantage upon economy trials when I.H.P. is accepted as a basis of comparison. Indicator diagrams are taken on trial from only the main propelling engines; but the boilers have to supply steam for numerous auxiliary engines, and the coal burnt on this account is weighed in and reckoned as coal per I.H.P. Therefore the returns under the latter heading are in any case misleading; but they are especially so at low powers, when the ratio between the total power exerted by the main engines and by the auxiliaries respectively is very much reduced—or in other words, the proportion of coal burnt for which no horse-power is registered (though exerted) is greatly increased.

Commodore Melville on the steam needed for auxiliary machinery

How important this feature is in estimating the economy of navy boilers has been well shown by the Engineers-in-Chief of both the British and the United States Navies respectively. We will take the latter first, as being the prior communication. Commodore Melville, in a paper read before the American Society of Naval Architects and Marine Engineers at their first meeting five years ago, gave particulars of the coal calculated to be needed through a wide range of speed for working auxiliaries in the U.S. cruiser Charleston. The details were worked out by Professor Hollis. At 18 knots (6120 I.H.P.), the highest speed, the coal burnt per day was 191·60 tons. Of this 85·5 per cent. was allotted to the working of the main engines. The lowest speed recorded was 4 knots, and at the power required for that (107 I.H.P.) only 31·1 per cent. of the coal burnt went to drive the main engines. At 7 knots (380 I.H.P.) the fuel used by the main engines was 53·9 per cent.; at 10 knots (960 I.H.P.) 67·4 per cent.; and at 14 knots (2820 I.H.P.) 78·3 per cent. The best economy was obtained at a speed of 16 knots (4370 I.H.P.), when 1·9 lbs. of coal were burnt per I.H.P. per hour, of which 81·2 per cent. were due to the main engines. At 18 knots (6120 I.H.P.) the coal per I.H.P. per hour was 2·5 lbs., which was also the figure recorded at 10 knots (960 I.H.P.). These latter figures are extremely instructive, showing how the engines were wasting coal at the lower power, whilst the boilers were uneconomical at the higher power, the

gain on one side balancing the loss on the other for both conditions of speed respectively; the result, 2·5 lbs. of coal, being a poor one from an economy point of view. Now 10 knots is considered a fair speed for economy with cargo steamers—though they often steam less—but it must not be forgotten that the Charleston is a much finer ship than the ordinary trader. At 17 knots the coal per horse-power hour was 2·1 lbs., the same as at 14 knots, but at 17 knots the percentage of coal to main engines was 83·5, while at 14 knots it was 78·3, thus showing how heavily auxiliaries bear on the coal-bill at lower speeds. Forced draught commenced at 14 knots, so we may doubtless conclude that the boilers were steaming at their best economy at a speed below this. Yet the best economy was not reached until 16 knots; showing how the sins of the engines are visited on the boilers when an estimate of efficiency of the latter is made through the medium of the indicator.

Sir John Durston's experiments.

Sir John Durston, in his paper read before the Institution of Naval Architects at the spring meeting of last year, also gives some valuable information upon this question of the large consumption of steam by auxiliaries. The details given in a table, marked C, attached to this paper, are extremely suggestive. It was found that for running the auxiliary machinery alone, taking steam from two boilers, that as much as 10·4 tons of coal per day were needed to keep the auxiliary machinery running. Of this it was estimated that 2·4 tons were required by the electric light machinery, and 5·4 tons for distilling 59·69 tons of water. An important point brought out in these trials was the effect of using high-pressure steam for auxiliary machinery. On one trial the boiler pressure was 280 lbs. per sq. in., and on another only 60 lbs. to the inch, the coal burnt being 15 per cent. less with the lower pressure. The degree of expansion in many of the auxiliary engines is, as the Engineer-in-Chief points out, either non-existent or very limited, and no advantage is gained by increasing the pressure beyond that which is absolutely necessary to obtain the full work. Naturally the remedy for this would be to design engines with cylinders of a capacity to just supply the power needed, though, of course, this would not prevent the waste due to working without expansion. As a matter of practical design, however, it is not possible to get exact correspondence between the maximum capacity of the engines and the work they have to do, as a margin, and often a pretty wide one, must always be left.

Arrangements have been made for carrying the exhaust steam from auxiliaries to the intermediate receiver of the main engines. This plan is sound in theory up to a certain point supposing the cylinders are proportioned for the purpose. Unfortunately, as a matter of

practice, the scheme is found to be attended with very grave difficulties through destroying the mobility of warships. It may be necessary to work the auxiliaries without the main engines, or perhaps to work the main engines without some of the auxiliaries. Of course there could be an alternative exhaust into the condenser, but this would entail a very complicated arrangement of pipes and valves. To use the exhaust for feed water heating is preferable.

Pipe condensation. Another feature emphasised by these trials was the loss due to condensation through radiation from steam pipes. In one trial the extreme after boilers were used, and on another the extreme forward pair. The former boilers were, naturally, nearer the engines, so that the piping was shorter than in the other case, and this resulted in a saving of 20 to 30 per cent. of the fuel burnt.

The facts here put forward in regard to auxiliaries on warships indicate that the time has arrived when the whole question needs, not so much consideration (for it has been well considered) as revision. In the early days of steam propulsion there were little more than the main engines and donkey pumps to which steam had to be supplied, but now with power for handling guns or revolving turrets, for hoisting, steering, air-compressing, ventilation, electric light, forced draught, and the many other purposes, there are pipes and machinery all over the ship. The loss of fuel due to the use of dozens of small engine cylinders is by no means the only evil that has to be faced. The radiation from steam-pipes raises the temperature to a most undesirable extent, as well as causing waste of heat. Again, bulkheads have to be pierced, and allowance made for expansion and contraction due to varying temperature in the pipes.

Electric driving for auxiliary machinery The natural remedy, often suggested for this, appears to be a central electrical generating station, with, in place of steam-engines, electric motors, on the spot where the work has to be done. An electric wire is a simple thing, easily fixed, can be carried round any number of awkward bends with facility, takes up little room, and does not radiate heat. In case of action, the severance of an electric conductor by shot or shell would result in the disablement of the motor it supplied with current, and in that respect it would stand in the same position the steam-pipe occupies towards a steam-engine. But if the steam-pipe were severed it would probably have the effect of clearing the compartment of every one in it. On the other hand, a fault in an electric wire is often a very difficult thing to locate and repair.

There are of course difficulties to be overcome and problems to be solved before a system of this nature can be made to work quite satisfactorily. One thing to be guarded against is the interference

with the ship's compasses, but here, we believe, considerable improvements have been made of late, which reduce the difficulty. The central station afloat will be subjected to the same difficulty of varying load factor as the central station ashore, but not to the same extent. With separate steam-engines for each purpose, as at present in use, the whole plant must be designed for the maximum possible demand so far as motive machinery is concerned; thus the boat-hoisting winches obviously cannot be used for forced draught purposes, though both are not likely to be working at the same time. It is true that if electro-motors be substituted for steam-engines the same remark applies, but the electro-motor is a small thing compared to the steam-engine, half the former being, as it were, contained in the engine and generator in the central station. Now it is immaterial to the station whether it is supplying current for the winches or the fans, so that by a little care a comparatively small engine can be made to do the work. If electric heating were used this would act as an excellent regulator, for it would always be possible to shut the heaters off for a few minutes without serious inconvenience. The vexed question of the respective advantages of alternate as against continuous current would be raised, but naturally cannot be gone into here. The continuous current is used for lighting purposes, and if it were decided that the advantages offered by alternate current were sufficient to warrant its use for power purposes, a separate service would have to be installed. This, however, would be less cumbersome and less inconvenient than the existing steam-pipes, and would also be less costly. One large central engine, working at high pressure with high grades of expansion, would give an economy that would more than counterbalance the loss due to conversion from steam power to electrical energy.

As we all know, a good deal has been done already in the utilisation of electric energy, both in our own and foreign navies. Electric fans are common on board ship, and in the Barfleur and the Centurion some years ago electrically-driven machinery was used for the shot and ammunition hoists, and worked most satisfactorily. The French and the German naval designers have carried the use of electricity for auxiliary machinery still further. The Aegir of the German Navy, an armour-clad vessel of the fourth class, has been fitted with electric appliances even for steering purposes and windlasses, the steering gear, it may be said, affording one of the most difficult positions for the application of electric power. Herr A. Dietrich, the Chief Constructor of the German Navy, has stated that "all new German warships in course of construction have electricity as motive

power, not only for ventilating fans, but also for the turning gear of the 15 c.m. gun turrets, for ammunition hoists, for boat hoisting and coaling winches, and for like gear." Electricity has also been used in the American Navy to a considerable extent. It may be said of all navies that whenever electricity is introduced into ships for the working of auxiliary machinery there will be found an engineering staff with the knowledge required to work the plant. Electric light is now universal in all warships, and it seems as if it would soon be fitted in almost all steamships of any class whatever. It may be pertinent to add here that Commodore Melville has recently stated that the experience of American naval engineers is that the auxiliary machinery gives most of the trouble on board ship, and that vessels of the United States Navy have been more frequently disabled on account of the failure of small engines than from any other cause due to the machinery.

Triple screws.

Reference has already been made to Commodore Melville's partiality for triple-screw warships, of which he has had some experience. It will be remembered that the two big American cruisers, Columbia and Minneapolis, had each three screws, and that they both gave excellent performances on trial, whilst the Columbia made a sensational run across the Atlantic at a high rate of steaming. Their designer attributed the success of these ships largely to the subdivision of their propelling mechanism, and since he read his paper before the American Society of Naval Engineers he has not changed his opinion. The subject is an important one, as other nations have followed the American lead. Sir William White, it will be remembered, was one of the pioneers of the twin-screw movement, and played the leading part in introducing double-propeller ships into our own Navy. Under these circumstances we may be sure that the advent of the triple-screw ships—some of them built avowedly to prey on maritime commerce—has not escaped the attention of the constructive department of our own Admiralty, and some time ago a very complete investigation was made into the subject. It is understood, however, that tank experiments did not bear out the high claims regarding the efficiency in propulsion made by Commodore Melville on behalf of triple screws, and twin propellers remain universal in the Royal Navy.

Columbia and Minneapolis.

Some years ago M. Marchel, a French naval constructor, made some experiments with triple screws on small vessels, and the results were considered so favourable to the arrangement that the Dupuy de Lome was given three screws, and other fast cruisers have since been built by the French Government as "commerce destroyers," the name officially given to the Columbia and Minneapolis. In the

Italian and German navies the Tripoli and the Kaiserin Augusta are also examples of triple-screw ships. Owing to the liberal manner in which the United States naval constructors put full professional details at the command of naval architects and marine engineers of all countries, we are able to give a few salient points of the American vessel. Those of our readers who are more particularly interested in this question would do well to refer to Commodore Melville's paper on the subject contributed to the meeting of the American Society of Naval Architects and Marine Engineers at the 1894 session. Full details of the trials of the Minneapolis were given in a paper by Passed Assistant Engineer Albert B. Willits, U.S.N., published in Vol. VI., p. 702, of the *Journal* of the American Society of Naval Engineers. The Minneapolis, having a displacement of 7387 tons, on a four hours' run made a speed of 23·073 knots, and thus became the fastest ocean-going vessel afloat. It was estimated at the time that the gain in economy of propulsion due to the use of three screws was no less than 11·9 per cent. as compared to twin screws of another vessel of the United States Navy, and considerably more in some other instances, going up even to 21 per cent. The results thus recorded of the official trials of the triple-screw vessels were certainly unexpected, and were no less surprising, even to the designers of the vessel. Before the Columbia was tried it was thought that the race from the side screws would affect the centre screw owing to an induced current being set up which would cause the centre screw to work in water having a sternward motion relatively to the ship. It was originally intended therefore to give the centre screw a higher pitch ratio, but the result of some experiments made caused the suggestion to be abandoned, and all three screws were given the same angle of blade. During the trials of the Columbia the centre screw made five revolutions per minute less than the side screws. This of course might have been due to the engines, but on working out indicator diagrams it was found that the mean effective pressure on the pistons was 3 lbs. more for the centre screw engines, or rather the equivalent of that if the pressure in all cylinders were reduced to the standard of the low pressure cylinder, according to the usual method of computation.

In view of these facts the pitch of the centre screw of the sister vessel, the Minneapolis, was made about 6″ less than that of the side screws, the latter being about 22 ft. pitch, in spite of which the centre screw ran only about one revolution per minute faster than the side screws, although the engines of the latter had 3 lbs. higher aggregate pressure. Commodore Melville accounted for this by the fact that, so far from the centre screw working in water having an

accelerated sternward motion due to the side screws, it revolved in water having a relative forward motion due to the following wake.

Since the Columbia and Minneapolis were tried, data as to screw efficiency have been gathered by the United States Engineering Bureau from a large number of vessels, and it has been found that in almost every case the propulsive effect has been above that of the twin-screw ships, whilst comparison with other ships of similar form has confirmed Commodore Melville as to the superiority of these screws in regard to efficiency, and there is, of course, the increased factor of safety owing to the lesser chance of these engines breaking down, although this is not nearly so apparent as in the case of going from the single screw to two. As the result of the study of trial data, Commodore Melville estimates approximately the average economy of twin screws over single screws to be about 8 per cent. for vessels of maximum speeds of from 12 to 20 knots, whilst triple screws are again superior in efficiency to twin screws by from 5 per cent. for 15-knot ships up to 12 per cent. for 24-knot vessels.

Experiments on the Ermack.

It has always been held that twin screws, as well as the wing screws of a three-screw ship, being some distance from the body of the vessel, the flow of water to them would not be impeded, and that there would be a gain from this cause as compared to the centre screw, which is necessarily working in water more or less disturbed by the passage of the ship. Moreover, with a centrally placed screw the approaching race is drawn right along the bottom of the vessel, whilst with twin screws supported out from the sides on brackets this is not necessarily the case. The effect of the propeller race in increasing the skin friction was curiously illustrated by some trials made with the Russian ice-breaking steamer Ermack in the early part of this year. This vessel has four screws, three at the after end (triple screws) and one forward under the forefoot. With her forward propeller working in the "go-astern" direction, and the other three turning in the "ahead" direction, the speed was said to be almost the same as when all four propellers were driving in the same direction. The conditions in other respects were reported as nearly as possible similar in both cases. This remarkable result was attributed to the fact that when the bow propeller was working "astern" the race was thrown out ahead, and the ship was therefore constantly entering upon a stream of water flowing in the same direction as that in which it was travelling; whilst, on the other hand, when the bow propeller was working "ahead," it was throwing its race under the bottom of the ship, thus creating a contrary current. The explanation is insufficient, as it would suppose that

the whole of the energy put into the race either lost or recovered in the two instances respectively.

However that may be, the case of the Ermack is strong evidence of the importance of increased skin friction due to acceleration caused by the propeller race, although with the ordinary ship it is only the approaching race that exerts this influence. There are advantages in the smaller diameter of twin screws as compared to single screws, and, further, of triple screws as compared to twin screws. The desirability of getting a screw well immersed in order that it may not draw down air is well known, and with rates of turning giving speeds approaching that critical point at which cavitation becomes serious, any reduction in diameter of propellers should be welcomed. Commodore Melville is of opinion that cavitation is less likely to be present with screws working in the following wake, and doubtless he has good reasons for his statement, though to us they are not apparent, other conditions being equal.

With a given draught of water to the ship, smaller screws may be placed so that the tips of the blades never approach so near the surface as with the larger single screw, a remark which applies to twin screws, but still more forcibly to triple screws. Deep immersion is beneficial because the form of the vessel, being fuller near the water plane, the disturbance of the water is greater there. The stream lines near the surface should not be interfered with, so that the water may close in behind the fuller part of the ship, and thus as much as possible be recovered of the energy expended at the bow by parting the water. The greatest forward motion of the wake occurs near the surface, and the effect diminishes as the keel is approached. This is an argument in favour of placing the screws near the surface, so as to gain the full advantage of the frictional wake acting on the blade surface, an important benefit claimed for the centre screw. Of course, other considerations demand the deeper immersion; one of these, not yet referred to, being that it is desirable to secure as equal a thrust as possible throughout each revolution; for if the blades have additional resistance at any one part of their turn, the propeller is not likely to be efficient, and an unequal turning movement on the shaft follows. The evil influence on screws of big stern posts, with the eddy following them, is well known.

Commodore Melville on triple screws.

It is however somewhat profitless to theorise alone on this problem. The conditions involved are too complex to allow of any definite result being arrived at by any other method than by experiment. We may conclude with safety that the model experiments made by the Admiralty have not been very promising, otherwise we should have seen triple-screw ships in our naval programme. Commodore

Melville is fully convinced of the greater efficiency of three screws, and, we understand, looks on tank experiments as of comparatively little worth for elucidating this problem, but at the same time he acknowledges there is a good deal to be done before definite figures can be advanced. He is sure, however, that there are advantages due to using small screws, and also there are advantages due to a screw working in the following wake. It may be that the advantages may be more or less counteracted by disadvantages, such as augmented skin resistance. Commodore Melville is also of opinion that the benefit from working in the following wake increases with the growth of speed.

Triple screws for cruising.

In considering the question, already discussed, of economy at cruising speeds, Commodore Melville gives us some interesting data. He takes a triple-screw cruiser of 12,000 tons and 23,000 maximum I.H.P., which will make 22 knots at full power. If one screw were uncoupled from the engine and allowed to revolve freely it would absorb 150 I.H.P. at 10 knots speed, and 600 I.H.P. at 15 knots. If the screw were coupled to the engine the power needed to turn it at 10 knots would be 300 horse. When two screws are dragged the loss of power is practically doubled, at the same speed, as compared with one screw. The loss of power due to condensation in an engine (not the result of expansion of steam in the cylinders, but attributable directly to the heating of the cylinder walls) is almost exactly one pound of steam for each horse-power of the maximum power for each engine. This figure is approximately correct for all speeds, increasing slightly for the lowest speeds. It applies to jacketed engines. These particulars are taken from an advance copy of a paper contributed by Commodore Melville to the spring meeting of the Institution of Naval Architects, not yet held at the time of writing. It is to be hoped there will be a good discussion on this paper.

From considerations set forth the author concludes it would be advisable to use a large centre screw and two smaller wing screws, the total power being divided equally between the big centre engines, on the one hand, and the two wing engines on the other; so that the latter would each be one half the power of the former, or one quarter to each of the wing engines, and two quarters to the centre engine. It has been found by experiment that the reduction in the size of wing engines, below what would be necessary if three equal engines were used, effects a saving of about 200 horse-power, or its equivalent in steam for a 22-knot cruiser at ordinary cruising speeds.

Balancing engines.

A feature in engine practice that has come somewhat into prominence during the past year is the balancing of marine engines in order to prevent vibration. Mr. Yarrow, the well-known builder

of torpedo-boats, and Mr. Schlick, a German engineer, may be considered as leading in this field of research, and more lately Mr. Tweedy, of Newcastle-on-Tyne, has done a good deal of excellent scientific work in elaborating details and making calculations of the stresses involved in the working of big marine engines. These three engineers have joined forces, and as a result have produced what is known as the Yarrow-Schlick-Tweedy system of engine balancing. Mr. Yarrow's earlier researches, made by means of a torpedo-boat, were embodied in a paper he read at a meeting of the Institution of Naval Architects, and have now become classic. The same may be said of Mr. Schlick's contributions on this subject to the transactions of the same society. Mr. Yarrow's paper will be found in the thirty-third volume of the transactions of the Institution, and Mr. Schlick's two papers in the thirty-fifth volume, p. 350, and the following volume, p. 167 respectively. To describe the system in detail would carry us too far afield, and involve the use of diagrams. The method of procedure is to have four cylinders, so that for a three-stage compound engine there are two low-pressure cylinders. These are placed outside or at the two ends of the row of cylinders. This allows the moving parts of the engine to be lighter at the ends, as the low-pressure stage being divided between two cylinders, there is naturally less power developed in each cylinder than if there were but one low-pressure cylinder. It is one of the axioms of the system that heavier working parts should be on the inside, that is the middle part of the crank shaft. This is secured by the above arrangement, and the cranks are set at angles which enables them to balance each other, cranks at opposite angles being placed as close together on the fore and aft line as possible, the valves of the low-pressure cylinders being outside. In quadruple-expansion engines equal power is developed in each cylinder, and in that case the pistons are weighted to get the required balance of working parts. It will be understood that there are many other details than those mentioned that have to be considered, but it may be said that the system has been remarkably successful in the large number of important vessels to which it has been applied, among which may be mentioned the new Royal yacht and the big White Star liner Oceanic. The system has also been adopted in several vessels of the Royal Navy. Balancing trials were made by the Admiralty authorities with the two big cruisers Powerful and Terrible, various angles of cranks being tried. The vibration on the Terrible was found to be a very serious feature, and, during the celebrated run from Gibraltar, when Mr. Goschen was on board, contributed not a little to the

unfortunate results. The alterations made by the Admiralty engineers, however, effected a great improvement, the excessive vibration disappearing after the arrangement of cranks had been properly adjusted.

An important influence on marine engine practice seems likely to be brought about by the introduction of a more scientific method of balancing for the purpose of preventing vibration, and it is an influence that will work for good, although some engineers may regret it. We refer to the standardising of general design. Messrs. Yarrow, Schlick and Tweedy have pretty conclusively proved that one system of arranging sequence of cylinders and crank angles is superior to others, and their system involves a definite arrangement of valve positions so long as the ordinary link motion is used. Already a large number of leading shipbuilders and steamship lines have made arrangements to work under the patents of the combination, so that a measure of uniformity has been brought about in the practice of different firms who would otherwise doubtless have followed entirely different practice. One does not, of course, mean to suggest that anything like finality has been reached in the science of engine design, but it will be on the whole a fortunate thing if some standard practice arises in regard to general design, so that engineers may be free to turn their attention to other essential features.

Nickel steel.

During the past year nickel steel has been taking the more prominent place in marine engineering practice that its merits seem to warrant. Forgings of this material have been more largely used, especially in the United States, and nickel steel rivets are found to give the strength of joint needed with stronger steel boiler shell plates. A drawback to the use of nickel steel plates is the difficulty of getting a good surface, but there has been improvement in this respect of late, together with promises of a still nearer approach to perfection in the future. It is this defect, coupled with high cost, that has militated against the introduction of nickel steel plates. The President of the West of Scotland Iron and Steel Institute, Mr. F. W. Paul, recently stated that there is an increasing demand for steel for marine work which would support a tensile stress of 38 to 43 tons per sq. in., having an extensibility of 15 per cent. on 8 ins., and would bend cold to a radius of three times the thickness of the plate. These are the conditions of test of nickel steel plates, but it has been found that steel without nickel could be produced which would meet these tests, and which would be both cheaper, and would give better assurance of clean surfaces for plates. Mr. Paul gave an instance of tests of normal steel $\frac{1}{4}$-in. plates which had a strength of

58 tons per sq. in., an elastic limit of 39½ tons per sq. in., and an elongation of 13 per cent. in 8 inches, with a contraction of area of 35 per cent. Mr. H. F. J. Porter gives some interesting tests made at the Watertown Arsenal, which may be quoted here by way of comparison. Long bars having a weight in the middle were supported at both ends, and were then revolved in order to imitate the conditions of work with shafts, crank, pins, etc., where the fibre of the metal is subjected to stresses continually varying from tension to compression. The following results are taken from among others given by Mr. Porter, as obtained at the Arsenal:—

Fibre stress in lbs. per square inch.	40,000	50,000
	revolutions.	revolutions.
Wrought iron breaks after	59,000	175,000
0·15 per cent. carbon steel breaks after . . .	170,000	765,000
0·35 per cent. carbon steel breaks after . . .	317,000	5,100,000
0·65 per cent. carbon steel breaks after . . .	3,689,000	—
0·75 per cent. carbon steel breaks after . . .	—	15,000,000
3 25 per cent. nickel steel carbon 0·25 to 0·30 per cent.	1,850,000	—
4·50 per cent nickel steel carbon 0·25 to 0·30 per cent.	2,360,000	—
5·50 per cent. nickel steel carbon 0·25 to 0·30 per cent.	4,370,000	—

Commodore Melville states that whereas carbon steel plates have been produced with a strength of over 74,000 lbs. and "thoroughly satisfactory in all other respects," nickel steel plates have been used in the boilers of the United States cruiser Chicago, having a tensile strength of 90,000 lbs. to the square inch, or not far from double the strength of the best wrought-iron boiler-plates of a few years ago. At the present time the same authority states nickel steel forgings, tempered and annealed, are turned out daily with a tensile strength of over 95,000 lbs., 65,000 lbs. elastic limit, an elongation of more than 21 per cent. in two inches, and a reduction of area of about 50 per cent., showing also a fine silky fracture.

Mr. Beardmore's paper.

Mr. W. Beardmore, of the Parkhead Forge, Glasgow, a large maker of nickel steel, gave, in a paper read two years ago, before a meeting of the Institution of Naval Architects, some interesting particulars of this material. By a table of tests he showed, to use his own words, "that in nickel steel of 0·26 per cent. carbon we have a metal the elastic limit of which is equal to the ultimate strength of ordinary carbon steel. Mild nickel steel gives all the properties of high carbon metal without the treacherous brittleness so painfully evident in the latter." The tests referred to were

made with specimens ranging from three-sixteenths up to one inch in thickness. We give three examples:—

	CARBON STEEL.		NICKEL STEEL.	
Thickness.	Ultimate.	Yield Point.	Ultimate.	Yield Point.
$\frac{3}{16}$ inch.	27·7 tons per sq. in.	13·5 tons per sq. in.	51·3 tons per sq. in.	29·5 tons per sq. in.
$\frac{3}{8}$ "	27·7 " "	14·0 " "	52·4 " "	30·4 " "
1 "	27·5 " "	14·5 " "	48·7 " "	28·3 " "

Mr. Beardmore gave instances of the superiority of nickel steel for marine shafting and other positions, and there appeared little doubt that the meeting of influential shipbuilders and marine engineers before which he read his paper agreed with him in the numerous advantages he claimed for the material. There is, however, one drawback which attends its use to which reference was made in the discussion, and which in most cases more than neutralises all its advantages. It is this which has chiefly prevented the realisation of Mr. Beardmore's wish that a nickel steel ship might be speedily built on the Clyde. This fatal defect is the dearness of nickel. Mr. James Riley, who was one of the very earliest workers in this field, has stated that a rough estimate of the price of nickel steel may be formed by adding to the cost of ordinary steel £3 per ton for each unit of nickel, that is to say, if there were 3 per cent. of nickel it would be necessary to add £9 to the existing price of boiler plates. That of course puts nickel steel out of the market for many purposes. The statement made by Mr. Riley is now two years old, but we can hardly hope for much improvement in this respect unless new and important deposits of nickel are discovered and worked. There are, however, many positions in which the superior qualities of nickel steel, even with a high percentage of the alloy, up to perhaps 25 per cent., will warrant its use, and indeed, as we have stated, fresh applications are constantly being found for it.

The Turbinia.

In the last number of the *Annual* reference was made to the Hon. C. A. Parsons's wonderful little torpedo boat, the Turbinia, and it was then stated that two destroyers were about to be built which would contain machinery similar to that in the vessel referred to. These boats are still in hand, but so much interest is attached to them that the following particulars may be given in advance:— The length between perpendiculars is 210 ft., the extreme breadth 21 ft., and the moulded depth 12 ft. 9 ins. At a draught of

5 ft. 4 ins. the displacement would be 320 tons. The engines are similar in design to those of the Turbinia, but differ from the latter in so far as they are composed of two separate sets of engines for the port and starboard sides of the vessel. It will be remembered that in the Turbinia there were three propeller shafts, on each of which there were three screws; in the new boats there will be four propeller shafts, each with two screws. The engines of these new vessels are designed to develop five times the power of the Turbinia's engines. On each side of the vessel there will be one high pressure turbine motor, driving the outer screw shaft, and on the inner screw shaft of each side there will be one low pressure motor and one small reversing turbine motor. The screws on the inner shaft will be used for going astern. The collective horse-power in each vessel will be 10,000 indicated, which it is calculated will give a speed of over 35 knots. When going astern the estimated speed is 16 knots, which should be enough for all practical purposes. On each side of the vessel there is a surface condenser, served by two air-pumps, driven by turbines. The two circulating pumps, however, are driven by ordinary double-acting engines. This is to be regretted, as it destroys the unity of the system. These circulating engines will be arranged to give as little vibration as possible, but it is a pity that with main engines running so absolutely quietly as the turbine motor it should be necessary to introduce for auxiliary purposes reciprocating engines, even the best of which create a certain amount of clatter and vibration. Although the engines of these two vessels are designed to develop double the horse-power of the present 30-knot destroyers, they will be of less weight, and this will permit an increase of about 12 per cent. in the size of the boilers. It is calculated that an additional heating surface of a destroyer of 310 tons displacement, due to her having steam turbine engines, should be about 2,000 sq. ft. It is also anticipated that the consumption of steam per horse-power realised will be much less than that of the reciprocating engines of this class. This economy has been put down to 25 per cent. The lowered centre of gravity is also an advantage with engines of this class, whilst the machinery can be driven at the very highest speeds without danger or any of the attendant difficulties which are so familiar to those who run full speed trials in ordinary torpedo craft. When the large boilers are worked to their full capacity, the steam will be utilised by the engines with a great degree of efficiency, and this will have an important bearing on the speeds attained. The point will be apparent, considered in connection with what has already been said as to the efficiency of engines and boilers at various speeds. The

following may be taken as approximately the weights of machinery with the new vessels: boiler-room weights with water and boilers, 100 tons 15 cwts.; engine-rooms weights with auxiliary gear and water in condensers, 52 tons 6 cwts.; propellers, shafting, etc., 7 tons 14 cwts. So that with 12,000 I.H.P. developed the weight of machinery is about 30 lbs. per I.H.P. In a 30-knot torpedo-boat destroyer of ordinary design and similar size the machinery weights might be taken approximately as follows: boiler-room weights with water, 78 tons; engine-room weights with auxiliary gear and water in condensers, 56 tons; shafting and propellers, 10 tons. With 6000 I.H.P. developed the weight of machinery would be about 53¾ lbs. per I.H.P. Mr. Parsons has not yet, so far as we are aware, prepared designs for a large cruiser, but we know that he has had drawings made of an Atlantic liner fitted with his type of marine engines. The estimate works out with a total reduction of engine-room weights of about one-half that of ordinary engines. There is a small reduction in steam consumption per I.H.P., a smaller engine-room staff is needed, and there is a less consumption of oil and stores. These advantages have been fairly well proved on a smaller scale, but, perhaps, the complete absence of vibration is even of more importance in a high-class passenger vessel.

G. R. DUNELL.

PART II.

BRITISH AND FOREIGN ARMOURED AND UNARMOURED SHIPS.

PART II.

ALPHABETICAL LIST OF BRITISH AND FOREIGN ARMOURED AND UNARMOURED SHIPS.

The lists of ships were subjected to important modifications (ed. 1896). The order of the columns was rearranged so as to correspond in the British and Foreign Lists. A column was introduced for complements in place of that for coal endurance, and the place in the foreign lists where a ship is built was added. The calibre of all foreign guns is now given in inches.

The maximum draught at normal displacement has been given wherever it was possible to ascertain it.

As every nation is constantly rearranging the armament of individual ships, it is only possible to publish the latest accessible information.

The vessels which in the British Official *Navy Lists* are called First-Class Gunboats, and in the French Lists are known as Aviso Torpilleurs, are called in these lists Torpedo Gunboats. Torpedo-boats of all classes below Torpedo Gunboats are placed in a separate list.

Storeships, Harbour Service Ships, and Training Ships are not included in these lists.

The ships of those Powers whose Navies are of small importance will be found at the end of Part II.

The sketches of many ships have been reduced to half scale, so as to enable more sketches to be given without increasing the size of the book.

The following abbreviations are used throughout the Alphabetical List, occurring mainly in the first column, showing the class of ship, and in the armour column:—

a.c.	Armoured cruiser.
a.g.b.	Armoured gunboat.
b.	Barbette ship.
br.	Broadside ship.
c.b.	Central-battery ship.
c.d.s.	Coast-defence ship.
c.	Composite-built hull.
comp. (in armour column).	Compound or steel-faced armour.
c.t.	Conning-tower.
corv.	Corvette.
cr.	Cruiser.
d.v.	Despatch vessel.
g.b.	Gunboat.
g.v.	Gun-vessel.
H.S.	Harveyed steel.
K.S.	Krupp steel.
I.	Iron hull.
shd.	Sheathed.
s.	Steel hull.
2 s.	Twin screw.
t.	Turret-ship.
t.	Trial-speed and I.H.P. at trials (in speed and I.H.P. columns).
to.cr.	Torpedo-cruiser.
to.g.b.	Torpedo-gunboat.
to.r.	Torpedo-ram.
w.	Wooden hull.

ARMAMENT ABBREVIATIONS.—As breech-loading rifled guns are now the most numerous in all fleets, it must be understood that all guns are of that description, unless it be otherwise indicated.

l.	Light guns under 15 cwt., including boats' guns.
M.L.R.	Muzzle-loading rifled guns.
Q.F.	Quick or rapid-firing guns.
f. tu. or b. tu.	Fixed or bow tube for discharging Fish Torpedoes.
„ sub.	Submerged tube for do.

BOILERS.—It has been thought desirable to indicate particulars of the water-tube boilers adopted in the principal fleets. The following abbreviations have, therefore, been given in the column devoted to indicated horse-power. Where no reference occurs the boilers are of the cylindrical type:—

W.T.	Water-tube boilers, where the type is not known or not yet decided.
B.	Belleville.
Bl.	Blechynden.
B. & W.	Babcock and Wilcox.
D'A.	D'Allest.
Du T.	Du Temple.
Nic.	Niclausse.
Nor.	Normand.
N.S.	Normand-Sigaudy.
T.	Thornycroft.
Y.	Yarrow.

GREAT BRITAIN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour. Side.	Armour. Bulk-head.	Armour. Gun Position	Armour. Back-ing. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coals that can be carried in Bunkers.*	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.	in.	in.			knots.	tons.	
a.c.	**Aboukir** .	S. shd.	12,000	440 0	69 6	26 3	2	21,000 B	Glasgow .	Fairfield .	Bldg.	722,985	6 K.S.	5 K.S.	6 K.S.	3–2	2 9·2-in. 12 6-in. Q.F., 17 smaller Q.F.	2	21·0	800 / 1600	615
a.c.	**Achilles** .	I.	9820	380 0	58 3½	27 3	1	4000	Chatham	Penn .	1864	444,546	4½	4½	4½	18–10	14 9-in. M.L.R., 2 6-pr., 8 3-pr. Q.F., 16 M., 2 l.	..	12·7	750	707
a.c.	**Africa** .	S.	14,100	500 0	71 0	26 0	2	30,000 B	Glasgow .	Fairfield .	Bldg.	†	6 K.S.	12 K.S.	12–5 K.S.	.. 3–2	2 9·2-in., 16 6-in. Q.F., 14 12-pr. Q.F., 3 3-pr.	2	23·0	1250 / 2500	..
t. 2nd c.	**Agamemnon** .	I.	8660	280 0	66 0	24 0	2	4500	Chatham	Penn .	1883	504,065	18–15	16	16	18–9 3	4 12·5-in M.L.R., 2 6-in., 6 6-pr. Q.F., 8 3-pr., 5 M., 2 l.	2	12·1	960	410
t. 2nd c.	**Ajax** .	I.	8660	280 0	66 0	24 0	2	4500	Pembroke	Penn .	1883	518,357									
a.c.	**Agincourt** .	I.	10,600	400 0	59 5	27 9	1	4000	Birkenh'd	Maudslay .	1868	465,477	5½	4½	5½	10	17 9-in., M.L.R., 2 20-pr., 10 3-pr. Q.F., 7 M., 5 l.	2	12·0	750	687
b. 1st cl.	**Albion** .	S.	12,950	390 0	74 0	25 5	2	13,500 B	Blackwall	Maudslay	Bldg.	802,910	8 H. S.	6 H. S.	12–5 H. S.	.. 3–2	4 12-in., 12 6-in. Q.F., 18 smaller Q.F., 2 l.	5 (4 sub.)	18·25	800 / 1850	700
c.b. 2nd c.	**Alexandra** .	I.	9490	325 0	63 8	26 6	2	7000	Chatham	Humphrys	1877	514,324	12	8–5	8	12–10 1½–1	8 10-in. M.L.R., 4 9·2-in., 6 4-in., 4 6-pr. Q.F., 6, 3-pr., 13 M., 3 l.	4	14·3	680	600
b. 1st cl.	**Anson** .	S.	10,600	330 0	68 6	27 3	2	11,500	Pembroke	Humphrys	1889	*x* 724,765	18 *comp.*	16 *comp.*	14–12 *comp.*	10–15 3–2½	4 13·5-in., 6 6-in., 12 6-pr. Q.F., 10 3-pr., 7 M., 2 l.	5	16·9	1200	515
c.b. 3rd c.	**Audacious** .	I.	6010	280 0	54 0	23 8	2	3300	Glasgow	Ravenhill .	1869	246,482	8	5	6	10	10 9-in. M.L.R., 8 4-in., 4 6-pr. Q.F., 6 3-pr., 6 M., 3 l.	4	11·6	500	492
a.c.	**Aurora** .	S.	5600	300 0	56 0	24 6	2	8500	Pembroke	Thomson .	1889	*x* 284,550	10 *comp.*	16 *comp.*	4½	6 3–2	2 9·2-in., 10 6-in. Q.F., 6 6-pr., 10 3 pr., 6 M., 3 l.	2 ·4	18·0	900	484
a.c.	**Australia** .	S.	5600	300 0	56 0	24 6	2	8500	Glasgow	Napier .	1888	259,390									
a.c.	**Bacchante** .	S. shd.	12,000	440 0	69 6	26 3	2	21,000 B	Glasgow .	Clydebank	Bldg.	†	6 K.S.	5 K.S.	6 K.S.	.. 3–2	2 9·2-in. 12 6-in. Q.F., 17 smaller, 9 l.	2	21·0	800 / 1600	615

b. 1st cl.	**Barfleur** .	S. shd.	10,500	360	0 70	0	25	6	2	13,163	Chatham	Greenock Foundry	1894	599,089	12 *comp.*	12 *comp.*	9	.. 2½–2	4	10-in., 10 4·7-in. Q.F., 8 6-pr., 12 3-pr., 7 M., 2 l.	7 (2 sub.)	18·5	1240	284
c.d.s. *c.b.*	**Belleisle** .	I.	4870	245	0 52	0	21	0	2	2600	Poplar .	Maudslay .	1878	240,000 (purchas'd)	12	9	9	16–9 3–1	4	12-in. M.L.R., 6 6-pr. Q.F., 6 M., 2 l.	2	11·9	510	284
c.b. 3rd c.	**Bellerophon** .	I.	7550	300	0 56	1	6	7	1	4000	Chatham	Penn .	1866	322,701	6	5	6	10	10	8-in., 4 6-in., 6 4-in., 4 6-pr. Q.F., 12 M., 4 l.	2	12·4	650	572
b. 1st cl.	**Benbow** .	S.	10,600	330	0 68	6	27	3	2	11,500	Blackwall	Maudslay .	1888	760,820	18 *comp.*	16 *comp.*	14–2 *comp.*	12–15 3–2½	2	16·25-in., 10 6-in. Q.F., 10 3-pr., 7 M., 2 l.	5	16·75	1200	509
. 1st cl.	**Bulwark** .	S.	15,000	400	0 75	0	26	9	2	15,000 B	Devonp't	Hawthorne	Bldg.		..	..	..	..	4	12-in. 12 6-in. Q.F., 18 12-pr., 8 M.	..	18·0	900 / 2000	750
b. 1st cl.	**Cæsar** .	S.	14,900	390	0 75	0	27	6	2	12,000	Portsm'th	Maudslay .	1897	865,533	9 H. S.	14–9 H. S.	14–6 H. S.	.. 4–2½	4	12-in., 12 6-in. Q.F., 18 12-pr., 12 3 pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
b. 1st cl.	**Camperdown** .	S.	10,600	330	0 68	6	27	3	2	11,500	Portsm'th	Maudslay .	1889	*x* 769,456	18 *comp.*	16 *comp.*	12 *comp.*	10–15 3–2½	4	13·5-in., 6 6-in., 12 6-pr. Q.F., 10 3-pr., 7 M., 2 l.	4	16·9	1200	515
b. 1st cl.	**Canopus** .	S.	12,950	390	0 74	0	25	5	2	13,500	Portsm'th	Greenock Foundry	Bldg.	835,257	6 H. S.	12 H. S.	12–5 H. S.	3–2	4	12-in., 12 6-in. Q.F., 18 smaller Q.F., 2 l.	5 (4 sub.)	18·25	800 / 1850	700
b. 1st cl.	**Centurion** .	S. shd.	10,500	360	0 70	0	25	6	2	13,214	Portsm'th	Greenock Foundry	1893	608,098	12 *comp.*	12 *comp.*	9 *comp.*	.. 2½–2	4	10-in., 10 4·7-in. Q.F., 8 6-pr., 12 3-pr., 7 M., 2 l.	7 (2 sub.)	18·51	1240	622
b. 1st cl.	**Collingwood** .	S.	9500	325	0 68	0	26	10	2	9500	Pembroke	Humphrys	1886	624,000	18 *comp.*	16 *comp.*	12 *comp.*	17–10 2½	4	12-in., 6 6-in., Q.F., 12 6-pr. 8 3-pr., 6 M., 2 l.	4	6·50	1200	480
t. 2nd c.	**Colossus** .	S.	9420	325	0 68	0	26	3	2	5500	Portsm'th	Maudslay .	1886	646,786	18–14 *comp.*	16–13 *comp.*	16 *comp.*	22–10 3–2½	4	12-in., 5 6-in., 4 6-pr. Q.F., 10 3-pr., 6 M., 4 l.	2	4·2	·970	388
t. 3rd c.	**Conqueror** .	S.	6200	270	0 58	0	24	0	2	6000	Chatham	Humphrys	1882	418,433	12–8½	11½	12	13 2½–1¾	2	12-in., 4 6-in., 6 6-pr. Q.F., 12 M., 2 l.	6	15·3	650	330
b. 1st cl.	**Cornwallis** .	S.	14,000	405	0 75	6	26	6	2	18,000 B	Blackwall	Thames S. Co.	Bldg.	†	7 K.S.	..	11–6 K.S.	..	4	12-in., 12 6-in. Q.F., 12 12-pr. Q.F., 6 3-pr.	4	19	900 / 2000	750
a.c.	**Cressy** .	S. shd.	12,000	444	0 69	6	26	3	2	21,000 B	Glasgow .	Fairfield .	Bldg.	723,012	6 K.S.	5 K.S.	6 K.S.	3–2	2	9·2-in. 12 6-in. Q.F., 17 smaller Q.F.	2	21·0	800 / 1600	615
c.d.s. *t.*	**Cyclops** .	I.	3560	225	0 45	0	16	4	2	1200	Blackwall	Elder .	1871	154,026	8–6	9–8	9	11 1½	4	10-in. M.L.R., 4 3-pr. Q.F., 5 M., 1 l.	..	9·9	250	196

* When two set of figures are given the upper shows the coal capacity at load draught. † Details of cost incomplete. *x* Includes Hydraulic Machinery, Gun Mountings, &c.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour. Side.	Armour. Bulk-head.	Armour. Gun Position	Armour. Back-ing. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coals that can be carried in Bunkers.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.	in.	in.			knots.	tons.	
t. 2nd c.	**Devastation** .	I.	9330	285 0	62 3	27 6	2	7000	Portsm'th	Maudslay	1873	353,848	12–10	12–10	14	18–16 **3–2**	4 10-in., 6 6-pr. Q.F., 8 3-pr., 5 M., 2 l.	2 (2 sub.)	14·0	1800	410
a.c.	**Drake** .	S.	14,100	500 0	71 0	26 0	2	30,000 B	Pembroke	Humphrys	Bldg.	*	6 K.S.	12 K.S.	12–5 K.S.	**3–2**	2 9·2-in., 16 6-in. Q.F., 14 12-pr. Q.F., 3 3-p.	2	23·0	1250 2500	..
t. 2nd c.	**Dreadnought** .	I.	10,820	320 0	63 10	26 9	2	6500	Pembroke	Humphrys	1875	592,573	14	13	14	18–15 **3–2**	4 12·5-in. M.L.R., 6 6-pr. Q.F., 12 3-pr., 7 M., 2 l.	2	13·7	1200	453
b. 1st cl.	**Duncan** .	S.	14,000	405 0	75 6	26 6	2	18,000 B	Blackwall	Thames S. Co.	Bldg.	*	7 K.S.	..	11–6 K.S.	..	4 12-in., 12 6-in. Q.F., 12 12-pr. Q.F., 6 3-pr	4	19·0	900 2000	750
t. 2nd cl	**Edinburgh** .	S.	9420	325 0	68 0	26 3	2	5500	Pembroke	Humphrys	1886	642,333	18–14 *comp.*	16–13 *comp.*	16 *comp.*	22–10 **3–2½**	4 12-in., 5 6-in., 4 6-pr. Q.F., 10 3-pr., 6 M., 2 l.	2	14·2	970	388
b. 1st cl	**Empress of India**	S.	14,150	380 0	75 0	27 6	2	13,000	Pembroke	Humphrys	1893	838,087	18–5 *comp.*	16 *comp.*	17–6 *comp.*	.. **3**	4 13·5-in., 10 6-in. Q.F., 16 6-pr., 12 3-pr., 8 M., 2 l.	7 (2 sub.)	17·5	1800	740
a.c.	**Euryalu** .	S. shd.	12,000	440 0	69	26 3	2	21,000 B	Barrow .	Vickers .	Bldg.	*	6 K.S.	5 K.S.	6 K.S.	**3–2**	2 9·2-in. 12 6-in Q.F., 17 smaller Q.F.	2	21·0	800 1600	615
b. 1st cl.	**Exmouth** .	S.	14,000	405 0	75 6	26 6	2	18,000 B	Laird .	Laird .	Bldg.	*	7 K.S.	..	11–6 K.S.	..	4 12 in., 12 6-in. Q.F., 12 12-pr. Q.F., 6 3-pr.	4	19.0	900 2000	750
b. 1st cl.	**Formidable** .	S.	15,000	400 0	75 0	26 9	2	15,000 B	Ports th	Earle .	Bldg.	997,201	6	12	12–5	.. **3–2**	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8 M.	..	18·0	900 2000	750
a.c.	**Galatea** .	S.	5600	300 0	56 0	24 6	2	8500	Glasgow .	Napier .	1889	258,390	10 *comp.*	16 *comp.*	4½	6 **3–2**	2 9·2-in., 10 6-in., Q.F., 6 6-pr. 10 3-pr., 6 M., 3 l.	4	18·1	900	484
c.d.s.	**Glatton** . .	I.	4910	245 0	54 0	19 5	2	2000	Chatham	Laird .	1872	219,529	12–10	12	14	20 **3–1½**	2 11-in. M.L.R., 3 6-pr. Q.F., 4 M., 1 l.		11·0	540	192
t. *b.* 1st cl.	**Glory** .	.	12,950	390 0	74 0	25 5	2	13,500 B	Laird .	Laird .	Bldg.	844,057	6 H. S.	12 H. S.	12–5 H. S.	3–2	4 12-in., 12 6-in. Q.F., 18 smaller Q.F., 2 l.	5 (4 sub.)	18·25	800 1850	700
b.	**Goliath** .	S.	12,950	390 0	74 0	25 5	2	13,500 B	Chatham.	Penn	Bldg.	812,968									

c.d.s. *t.*	**Gorgon** .	. I.	3560	225	0	45	0	16	4	2	1200	Jarrow	Ravenhill	1872	188,567	8–6	9–8	10	11 1½	4 10-in. M.L.R., 4 3-pr. Q.F., 5 M., 2 l.	..	9·9	270	192
b. 1st cl.	**Hannibal** .	. S.	14,900	390	0	75	0	27	6	2	12,000	Pembroke	Harland	1897	867,403	9 H. S.	14–9 H. S.	14–6 H. S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
c.d.s. *t.*	**Hecate** .	. .	3560	225	0	45	0	16	4	2	1200	Poplar	Ravenhill	1872	140,593	8–6	9–8	10	11 1½	4 10-in. M.L.R., 4 3-pr. Q.F., 4 M., 1 l.	..	9·9	270	205
a.b. 3rd c.	**Hercules** .	. I.	8680	325	0	59	0½	26	6	1	8500	Chatham	Penn .	1868	361,134	9–6	6–5	9	12–10	8 10-in. M.L.R., 2 9-in. do., 4 7-in. do., 6 4·7-in. Q.F., 9 6-pr., 13 3-pr., 7 M., 2 l.	4	14·6	610	638
t. 3rd c	**Hero** .	. S.	6200	270	0	58	0	24	0	2	6000	Chatham	Rennie .	1888	397,271	12 *comp.*	11½ *comp.*	12 *comp.*	13½ 2½–1½	2 12-in., 4 6-in., 7 6-pr. Q.F., 3-pr., 6 M., 2 l.	6	15·2	620	330
a.c.	**Hogue** .	. S. shd.	12,000	440	0	69	6	26	3	2	21,000 B	Barrow .	Vickers .	Bldg.	724,492	6 K.S.	5 K.S.	6 K.S.	3–2	2 9·2-in. 12 6-in. Q.F., 17 smaller Q.F.	2	21·0	800 1600	615
t. 1st cl	**Hood** .	. S.	14,150	380	0	75	0	27	6	2	13,000	Chatham	Humphrys	1893	830,536	18 *comp.*	17 *comp.*	18–6 *comp.*	.. 3	4 13·5-in., 10 6-in. Q.F., 10 6-pr., 12 3-pr., 8 M., 2 l.	7 (2 sub.)	17·5	1800	730
c.d.s. *t.*	**Hotspur** .	. I.	4010	235	0	50	0	21	10	2	2500	Glasgow .	Napier .	1871	171,528	11 & 8	8	10–8½	15–10 2–1	2 12-in. M.L.R., 2 6-in., 8 12-pr., 4 3-pr. Q.F., 8 M., 2 l.	..	11·25	300	232
b. 1st cl.	**Howe** .	. S.	10,300	325	0	68	0	27	3	2	11,500	Pembroke	Humphrys	1889	667,022	18 *comp.*	16 *comp.*	11½ *comp.*	15–12 3–2½	4 13·5-in., 6 6-in. 5-ton, 12 6-pr. Q.F., 10 3-pr., 7 M., 2 l.	1	16·8	1200	515
c.d.s. *t.*	**Hydra** .	. I.	3560	225	0	45	0	16	4	2	1200	Glasgow	Elder .	1872	141,372	8–6	9–8	9–10	11–9 1½	4 10-in. M.L.R., 4 3-pr. Q.F., 5 M., 2 l.	..	9·9	250	196
b. 1st cl.	**Illustrious** .	. S.	14,900	390	0	75	0	27	6	2	12,000	Chatham	Penn .	1898	885,945	9 H. S.	14–9 H. S.	14–6 H. S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
a.c.	**Immortalité** .	. S.	5600	300	0	56	0	22	6	2	8500	Chatham	Earle .	1889	278,500	10 *comp.*	16 *comp.*	4½	6 3–2	2 9·2-in., 10 6-in. Q.F., 6 6-pr., 10 3-pr., 6 M., 3 l.	2	18·0	900	484
a.c.	**Impérieuse** .	. S. shd.	8400	315	0	62	0	27	4	2	10,000	Portsm'th	Maudslay	1886	*x* 530,814	10 *comp.*	9 *comp.*	4½ *comp.*	10 4–2	4 9·2-in., 10 6-in. Q.F., 8 6-pr., 10 3-pr., 6 M., 2 l.	6	16·7	1130	544
t. 2nd c.	**Inflexible** .	. I.	11,880	320	0	75	0	26	4	2	6500	Portsm'th	Elder .	1881	795,268	24–16	22–14	17 *comp.*	17–25 3	4 16-in. M.L.R., 8 4-in., 4 6-pr. Q.F., 2 3-pr., 15 M., 2 l.	4 (2 sub.)	12·8	1300	485
c.b. 3rd c.	**Invincible** .	. I.	6010	280	0	54	0	23	2	2	3500	Glasgow	Napier	1870	239,441	8	5	6	10	10 9-in. M.L.R., 6 4-in., 15 M., 4 l.	4	12·5	500	492

* Details of cost incomplete.

x Includes Hydraulic Machinery, Gun Mountings, &c.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour. Side.	Armour. Bulk-head.	Armour. Gun Position.	Armour. Back-ing. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coals that can be carried in Bunkers.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.	in.	in.			knots.	tons.	
c.b. 3rd c.	Iron Duke	I.	6010	280 0	54 0	23 3	2	3500	Pembroke	Ravenhill	1871	196,479	8	5	6	10	10 9-in. M.L.R., 4 5-in., 4 20-pr., 14 M., 4 l.	4	12·5	500	492
b. 1st cl.	Implacable Irresistible London	S.	15,000	400 0	75 0	26 9	2	15,000 B	D'port Chatham Portsm'h	Laird Maudslay Earle	Bldg.	1,002,909 986,731 *	6 K.S.	12 K.S.	12–5 K.S.	.. 3–2	4 12-in. 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8 M.	2	18·0	900 2000	755
a.c.	King Alfred Leviathan	S.	14,100	500 0	71 0	26 0	2	30,000 B	Barrow Clydeb'k	Vickers Clydeb'k	Bldg.	*	6 K.S.	12 K.S.	12–5 K.S.	.. 3–2	2 9·2-in., 16 6-in. Q.F., 14 12-pr. Q.F., 3 3-pr.	2	23·0	1250 2500	..
b 1st cl.	Jupiter	S.	14,900	390 0	75 0	27 6	2	12,000	Clydeb'nk	Thomson	1897	901,216									
b 1st cl.	Magnificent	S.	14,900	390 0	75 0	27 6	2	12,000	Chatham	Penn	1895	912,291									
b 1st cl.	Majestic	S.	14,900	390 0	75 0	27 6	2	12,000	Portsm'th	Barrow	1895	910,632	9 H. S.	14–9 H. S.	14–6 H. S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8 M.	5 (4 sub.)	17·5	1850	757
b 1st cl.	Mars	S.	14,900	390 0	75 0	27 6	2	12,000	Birkenh'd	Laird	1897	902,631									
a.c.	Minotaur	I.	10,690	400 0	59 4¾	27 3	1	4000	Blackwall	Penn	1867	456,830	5½	4½	5½	10	17 9-in. M.L.R., 4 4·7-in. Q.F., 8 3-pr. 8 M., 3 l.	2	12·0	750	701
t. 3rd c.	Monarch	I.	8930	330 0	57 6	26 7	1	8216	Chatham	Maudslay	1869	354,575	7–6	5–4½	8	12	4 12-in. M.L.R., 2 9-in. do., 1 7-in. do., 4 12-pr. Q.F., 10 3-pr., 6 M., 2 l.	2	15	630	598
a.c.	Narcissus	S.	5600	300 0	56 0	24 6	2	8500	Hull	Earle	1889	257,390	10 *comp.*	16 *comp.*	4½	6 3–2	2 9·2-in., 10 6-in. Q.F., 6 6-pr., 10 3-pr., 6 M., 3 l.	4	18·1	900	484
a.c.	Nelson	I. shd.	7630	280 0	60 0	26 6	2	5500	Glasgow	Elder	1880	390,855	9–6	9–6	6	13–10	4 10-in. M.L.R., 8 9-in. do., 4 4·7-in. Q.F., 6 6-pr., 14 3-pr., 7 M., 3 l.	2	13·6	1150	580

a.c.	Northampton	I. shd.	7630	280	0	60	0	25	9	2	4500	Glasgow	Penn	1878	395,804	9 6	9 6	6	13–10 3–2	4	10-in. M.L.R., 8 9-in. do., 4 4·7-in. Q.F., 8 3-pr., 10 M., 3 l.	2	12·6	1150	580
t. 2nd c.	Neptune	I. shd.	9310	300	0	63	0	26	1	1	6000	Poplar	Penn	1878	600,000 (purchas'd)	12–9	8–6	11–13	11–13 3–2	4	12·5-in. M.L.R., 2 9-in. do., 6 6-pr. Q.F., 8 3-pr., 11 M., 2 l.	2	13·4	670	412
t. 1st cl.	Nile	S.	11,940	345	0	73	0	27	6	2	12,000	Pembroke	Maudslay	1890	819,717	20–16 comp.	18–14 comp.	18 comp.	6 3	4	13·5-in., 6 4·7-in. Q.F., 8 6-pr., 12 3-pr., 7 M., 3 l.	6 (2 sub.)	16·7	1200	558
a.c.	Northumberland	I.	10,780	400	4	59	5	27	1	1	4381	Millwall	Penn	1868	471,352	5½	4½	5½	10	7	9-in. M.L.R., 20 8-in. do., 1 6-in., 1 5-in., 6 4·7-in. Q.F., 10 3-pr., 6 M., 5 l.	..	13·3	756	701
b. 1st cl	Ocean	S.	12,950	390	0	74	0	25	5	2	13,500 B	Devonport	Hawthorn	Bldg.	844,795	6 H. S.	12 H. S.	12–5 H. S.	3–2	4	12-in., 12 6-in. Q.F., 18 smaller Q.F., 2 l.	5 (4 sub.)	18·25	800 1850	700
c.d.s.	Orion	I.	4870	245	0	52	0	21	4	2	2600	Poplar	Maudslay	1882	292,229	12–7	9–5	8	16–9 3–1	4	12-in. M.L.R., 6 6-pr. Q.F., 6 M., 2 l.	4	11·9	520	284
a.c.	Orlando	S.	5600	300	0	56	0	24	8	2	8500	Jarrow	Palmer	1888	266,812	10 comp.	16 comp.	4½ comp.	6 3–2	2	9·2-in., 10 6-in. Q.F., 6 6-pr., 10 3-pr., 7 M., 3 l.	2	18·1	900	484
c.d.s. c.b.	Penelope	I.	4470	260	0	50	0	17	6	2	2700	Pembroke	Maudslay	1868	186,848	6–5	4½	5	10–11	8	9-ton M.L.R., 4 3-pr. Q.F., 11 M., 4 l.	..	11·0	470	265
c.d.s. t.	Prince Albert	I.	3880	240	0	48	1	20	4	1	1300	Poplar	Humphrys	1866	202,666	4½	5	4½	18 ¾	4	12-ton M.L.R., 6 M., 2 l.	..	9·7	230	205
b. 1st cl.	Prince George	S.	14,900	390	0	75	0	27	6	2	12,000	Portsm'th	Humphrys	1896	885,037	9 H. S.	14–9 H. S.	14–6 H. S.	.. 4–2½	4	12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 2 l.	5 (4 sub.)	17·5	1850	757
b. 1st cl.	Renown	S. shd.	12,350	380	0	72	0	23	9	2	12,000	Pembroke	Maudslay	1896	696,425	8–6 H. S.	10–6 H. S.	10 H. S.	.. 3–2	4	10-in. 29-ton, 10 6-in. Q.F., 14 12-pr., 12 3-pr., 7 M., 2 l.	5 (2 sub.)	18·0	1800	674
b. 1st cl.	Ramillies	S.	14,150	380	0	75	0	27	6	2	13,000	Glasgow	Thomson	1893	874,255										
b. 1st cl.	Repulse	S.	14,150	380	0	75	0	27	6	2	13,000	Pembroke	Humphrys	1894	841,274										
b. 1st cl.	Resolution	S.	14,150	380	0	75	0	27	6	2	13,000	Jarrow	Palmer	1893	852,755	18–5 comp.	16 comp.	17 comp.	.. 3	4	13·5in., 10 6-in. Q.F., 16 6-pr., 12 3-pr., 8 M., 2 l.	7 (2 sub.)	17·5	1800	730
b. 1st cl.	Revenge	S.	14,150	380	0	75	0	27	6	2	13,000	Jarrow	Palmer	1895	852,755										
b. 1st cl.	Royal Oak	S.	14,150	380	0	75	0	27	6	2	13,000	Birkenh'd	Laird	1894	877,378										
b. 1st cl.	Royal Sovereign	S.	14,150	380	0	75	0	27	6	2	13,312	Portsm'th	Humphrys	1892	824,583										

* Details of cost incomplete.

ƨ Includes Hydraulic Machinery, Gun Mountings, &c.

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GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour. Side.	Armour. Bulk-head.	Armour. Gun Position	Armour. Backing. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coals that can be carried in Bunkers.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.	in.	in.			knots.	tons.	
b. 1st cl.	Rodney .	S.	10,300	325 0	68 0	27 3	2	11,500	Chatham	Humphrys	1888	669,278	18 *comp.*	16 *comp.*	11 *comp.*	15–12 **3–2½**	4 13·5 in., 6 6-in. Q.F., 12 6-pr., 10 3-pr., 6 M., 2 l.	4	16·75	1200	515
c.d.s. t.	Rupert .	I.	5440	250 0	53 0	23 7	2	6000	Chatham	Portsm'th .	1874	232,677	11–9	12	14–12	14–10 **3–2**	2 9·2-in., 2 6-in., 4 6-pr. Q.F., 6 3-pr., 2 M., 2 l.	4	14·0	480	293
b. 1st cl.	Russell .	S.	14,000	405 0	75 6	26 6	2	18,000 B	Hull .	Palmer .	Bldg.	‡	7 K.S.	..	11–6 K.S.	..	4 12-in., 12 6-in. Q.F., 12 12-pr. Q.F., 6 3-pr.	4	19	900 / 2000	750
t. 1st cl.	Sans Pareil .	I.	10,470	340 0	70 0	27 3	2	14,000	Blackwall	Humphrys	1889	*x* 719,442	16–18 *comp.*	16 *comp.*	18 *comp.*	6 3	2 16·25in., 1 10-in., 12 6-in. Q.F., 12 6-pr., 12 3-pr., 8 M., 2 l.	6 (2 sub.)	17·2	1200	583
c.d.s. t.	Scorpion .	I.	2750	224 6	42 4½	16 11	1	1000	Birkenh'd	Laird .	1865	110,573	4½	..	5	10–8	4 9-in. M.L.R., 6 M., 1 l.	..	8·5	320	151
a.c.	Shannon .	I. shd.	5390	260 0	54 0	23 4	1	2500	Pembroke	Laird .	1877	287,169	9–6	9–8	9	10–12 **3–1**	2 10-in. M.L.R., 7 9-in. do., 6 20-pr., 11 M., 8 l.	2	11·2	580	456
c.b. 3rd c.	Sultan .	I.	9290	325 0	59 0½	27 6	1	8000	Chatham	Thomson .	1871	357,415	9–6	6–4½	9–8	12–10	8 10-in. M.L.R., 4 9-in.do., 4 4·7-in. Q.F., 9 6-pr., 13 3-pr., 7M., 2 l.	4	14·0	810	661
c.b. 2nd c.	Superb .	I.	9170	332 3	59 0	26 5	1	8500	Blackwall	Maudslay	1880	443,000 (purchas'd)	12–10	10–5	10	7–12 **1½**	16 10-in. M.L.R., 6 4-in., 6 6-pr. Q.F., 10 3-pr., 6 M., 3 l.	4	15·0	970	654
a.c.	Sutlej .	S. shd.	12,000	440 0	69 6	26 3	2	21,000 B	Clydeb'nk	Clydebank Company	Bldg.	733,625	6 K.S.	5 K.S.	6 K.S.	.. **3–2**	2 9·2-in. 12 6-in. Q.F., 17 smaller Q.F.	2	21·0	800 / 1600	615
c.b. 3rd c.	Swiftsure .	I. shd.	6910	280 0	55 0	26 0	1	3500	Jarrow	Maudslay .	1872	257,081	8–6	6–4	6	10	10 9-in. M.L.R., 8 4-in., 4 3-pr. Q.F., 12 M., 3 l.	4	12·6	540	497
c.b. & b 2nd c.	Temeraire .	I. shd.	8540	285 0	62 0	27 2	2	6500	Chatham	Humphrys	1877	454,969	11–8	8–5	10–8	12–10 **1½–1**	4 11-in. M.L.R., 4 10-in.do., 6 4-in. 4 6-pr. Q.F., 10 3-pr., 8 M., 4 l.	2	13·8	620	592

t. 2nd cl.	Thunderer .	I.	9330	285	0	62	3	27	0	2	7000	Pembroke	Maudslay	1877	358,542	12–10	12–10	14–12	18–16 3–2	4 10-in., 6 6-pr. Q.F., 8 3-pr., 4 M., 2 l.	2	14·0	1600	592
t. 1st cl.	Trafalgar .	S.	11,940	345	0	73	0	27	6	2	12,000	Portsm'th	Humphrys	1890	862,794 x	20–16 comp.	18–14 comp.	18 comp.	6 3	4 13·5 in., 6 6-in. Q.F., 8 6-pr., 12 3-pr., 6 M., 3 l.	6 (2 sub.)	16·7	1200	572
c.b. 3rd c.	Triumph .	I. shd.	6640	280	0	55	0	26	2	1	3500	Jarrow	Maudslay	1873	258,322	8–6	6–4	6	10	10 9-in. M.L.R., 4 5-in., 8 6-pr. Q.F., 8 3-pr., 5 M., 3 l.	4	12·6	550	497
a.c.	Undaunted .	S.	5600	300	0	56	0	22	6	2	8500	Jarrow .	Palmer .	1889	256,055	10 comp.	16 comp.	4½ comp.	6 3–2	2 9·2-in., 10 6-in. Q.F., 6 6-pr., 10 3-pr., 7 M., 3 l.	4	18·1	900	484
b. 1st cl.	Victorious .	S.	14,900	390	0	75	0	27	6	2	12,000	Chatham	Hawthorn	1897	868,313	9 H. S.	14–9 H. S.	14–6 H. S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
b. 1st cl.	Venerable. .	S.	14,700	400	0	75	0	26	9	2	15,000 B	Chatham	Maudslay	Bldg.	‡	..	..	..	..	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8 M.	2	18·0	900 / 2000	755
b. 1st cl.	Vengeance .	S.	12,950	390	0	74	0	26	0	2	13,500 B	Barrow .	Vickers .	Bldg.	814,619	6 H.N.S.	12 H.N.S.	12–6 H.S.	4 2–1	4 12-in., 12 6-in. Q.F., 12 12-pr., 18 smaller guns.	..	18·25	800 / 1850	750
a.c.	Warspite .	S.	8400	315	0	62	0	27	4	2	10,000	Chatham	Penn .	1888	529,332	10 comp.	9 comp.	8 comp.	10 3–2	4 9·2-in., 10 6-in. Q.F., 4 6-pr. Q.F., 9 3-pr., 6 M., 2 l.	6	16·7	1130	535
c.d.s.	Wivern .	I.	2750	224	6	42	4	17	0	1	1000	Birkenh'd	Laird .	1865	116,514	4½	..	5	8–10	4 9-in. M.L.R., 8 M., 1 l.	..	8·5	300	151
a.c.	2 new ships§ (Programme 1898-9.)	S.	12,000	440	0	69	9	26	3	2	21,000 B	P'sm'th P'broke	..	..	..	6 K.S.	5 K.S.	6 K.S.	.. 3–2	2 9·2-in., 12 6-in. Q.F., 17 smaller Q.F.	2	21·0	800 / 1600	615
a.c.	2 new ships § .	S.	9800	440	0	66	0	24	5	2	22,000 B	..	..	..	..	4	..	..	..	14 6-in. Q.F., 10 12-pr. Q.F., 3 3-pr.	2	23·0	800 / 1600	..
b.	2 new ships .	S.	Design not settled.									Chath'm D'port												

The following, which appear in the Official Navy List, are lent to India and Australia:—

c.d.s. t.	Abyssinia* (*Indian Marine.*)	I.	2900	225	0	42	0	14	6 6	2	900	Poplar	Dudgeon	1870	116,549	7–6	8–7	10–8	11–9 1½–1	4 8-in. 14-ton, 7 M., 2 l.	..	9·0	92	193
c.d.s. t.	Cerberus† (*Victorian Marine.*)	I.	3480	225	0	45	0	15	3	2	1660	Jarrow	Maudslay	1870	117,556	8–6	9–8	10–9	11–9 1½–1	4 10-in. 18-ton M.L.R., 4 M.	..	9·75	120	196
c.d.s. t.	Magdala*. (*Indian Marine.*)	I.	3340	225	0	45	0	15	3	2	1400	Blackwall	Ravenhill	1870	132,400	8–6	9–8	10–9	11–9 1½–1	4 8-in. 14-ton, 7 M., 2 l.	..	10·0	120	194

x Includes Hydraulic Machinery, Gun Mountings, &c. * At Bombay. † At Melbourne. ‡ Details as to cost not complete. § Designs only provisional.

GREAT BRITAIN.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
Sloop	Acorn	C.	970	167 0	32 0	14 0	1	1200	Milford Haven	Maudslay	1884	42,000	..	..	8 5-in. 38-cwt., 8 M., 1 l.	..	12·2	150	126
2nd cl. Cr.	Active	I. shd.	3080	270 0	42 0	21 4	1	2400	Blackwall	Humphrys	1869	126,156	..	..	10 6-in., 2 64-pr. M.L.R., 9 M., 2 l.	..	15·10	410	339
" "	Æolus	S. shd.	3600	300 0	43 0	17 6	2	9000	Devonp'rt	Hawthorn	1892	208,450	4½	2–1	2 6-in. Q.F., 6 4·7-in. 8 6-pr. 1 3-pr., 4 M., 1 l.	4	19·75	400	273
Dsp. Ves.	Alacrity	S.	1700	250 0	32 6	14 0	2	3000	Jarrow	Palmer	1885	77,969	..	..	10 6-pr. Q.F., 2 M.	..	17·00	400	114
T. G. B.	Alarm	S.	810	230 0	27 0	8 9	2	3884	Sheerness	Penn	1892	59,346	4½	..	2 4·7-in. Q.F., 4 3-pr. do.	3	19·25	100	91
2nd cl. G. B.	Albacore	C.	560	135 0	26 0	10 6	1	500	Birkenh'd	Laird	1883	28,556	..	..	2 5-in., 2 4-in., 2 M.	..	11·0	85	59
Sloop	Alert	S. shd.	960	180 0	32 6	11 6	1	1400	Sheerness	Sheerness	1894	60,309	..	..	6 4-in. 25-pr. Q.F., 4 3-pr., 2 M.	..	13·25	130	101
"	Algerine	S.	1050	185 0	32 6	11 3	2	1400	Devonp'rt	Devonport	1895	63,904	·22	..	6 4-in. 25-pr. Q.F., 4 3-pr., 3 M.	..	13·0	160	106
2nd cl. Cr.	Amphion	S.	4300	300 0	46 0	20 6	2	5000	Pembroke	Maudslay	1883	160,500	..	1½	10 6-in. Q.F., 4 3-pr., 10 M., 2 l.	4	16·6	1000*	309
" "	Andromache	S.	3400	300 0	43 0	16 6	2	9000	Chatham	Earle	1890	186,280	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
"	Apollo	S.	3400	300 0	43 0	16 6	2	9000	Chatham	Earle	1891	186,361							
1st cl. Cr.	Andromeda	S. shd.	11,000	435 0	69 0	25 3	2	16,500 B	Pembroke	Hawthorn	1897	531,887	4½	3–6	16 6-in. Q.F., 14 12-pr., 12 3-pr., 2 12-pr. boat.	3 (2 sub.)	20·5	1000	600
T. G. B.	Antelope	S.	810	230 0	27 0	8 9	2	3621	Devonp'rt	Yarrow	1893	61,397	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
3rd cl. Cr.	Archer	S.	1770	225 0	36 0	14 6	2	3500	Glasgow	Thomson	1885	x87,583	..	..	6 6-in. Q.F., 8 3-pr., 2 M., 1 l.	3	16 5	475	172

1st cl. Cr.	Argonaut	S. shd.	11,000	435	0	69	0	25	3	2	18,000 B	Fairfield	Fairfield	1898	535,557							
" "	Ariadne	S. shd.	11,000	435	0	69	0	25	3	2	18,000 B	Clydeb'nk	Thomson	1898	543,705	3–6 H. S.	4	16 6-in. Q.F., 14 12-pr., 12 3-pr., 2 12-pr. boat.	3 (2 sub.)	20·75	1000	677
" "	Amphitrite	S. shd.	11,000	435	0	69	0	25	3	2	18,000 B	Barrow	Vickers	1898	546,227							
2nd cl. Cr.	Arethusa	S.	4300	300	0	46	0	20	6		5000	Glasgow	Napier	1882	145,198		1½	10 6-in. Q.F., 8 3-pr., 6 M., 2 l.	4	16·6	1000*	309
" "	Arrogant	S.	5800	320	0	57	6	21	0	2	10,000 B	Devonp'rt	Earle	1896	278,878	4½ N.S.	1–2 N. S.	4 6-in., Q.F., 6 4·7-in., 9 12-pr., 3 3-pr., 1 12-pr. boat, 5 M.	2	19·1	500	480
" "	Astræa	S. shd.	4360	320	0	49	6	19	0	2	9112	Devonp'rt	Devonport	1893	244,831	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr. 1 3-pr., 4 M., 1 l.	4	19·75	400	312
3rd cl. Cr.	Barham	S.	1830	280	0	35	0	13	3	2	4700 T	Portsm'th	Hawthorn	1889	113,302	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	2	18·6	140	169
" "	Bellona	S.	1830	280	0	35	0	13	3	2	4700	Newcastle	Hawthorn	1890	94,195	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	2	17·8	140	169
" "	Barracouta	S.	1580	220	0	35	0	14	0	2	3000	Sheerness	Palmer	1889	96,315	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	2	16·5	160	159
" "	Barrosa	S.	1580	220	0	35	0	14	0	2	3000	Portsm'th	Palmer	1889	79,238	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 3 M.	2	16·5	160	159
" "	Blanche	S. shd.	1580	220	0	35	0	14	0	2	3000	Pembroke	Earle	1889	91,112	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	2	16·5	160	159
" "	Blonde	S. shd.	1580	220	0	35	0	14	0	2	3000	Pembroke	Earle	1889	90,059	4½	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	2	16·5	160	159
Sloop	Basilisk	S. shd.	1170	195	0	28	0	12	6	2	2000	Sheerness	Rennie	1889	58,013							
"	Beagle	S. shd.	1170	195	0	28	0	12	6	2	2000	Portsm'th	Rennie	1889	56,474	..	..	8 5-in., 8 M.	..	14·7	160	138
1st cl. Cr.	Blake	S.	9000	375	0	65	0	25	9	2	20,000	Chatham	Maudslay	1889	440,471	6	6–3	2 9·2-in., 10 6-in. Q.F., 16 3-pr Q.F., 7 M., 2 l.	4 (2 sub.)	21·5	1500	570
" "	Blenheim	S.	9000	375	0	65	0	25	9	2	21,411	Blackwall	Humphrys	1890	425,591							

¤ Includes Gun Mountings, &c.

* Bunker capacity.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.		knots.	tons.		
2nd cl. Cr. .	Bonaventure .	S. shd	4360	320 0	49 6	19 0	2	9000	Devonp'rt	Hawthorn.	1892	247,128	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr. 4 M., 1 l.	4	19·5	400	312
T. G. B. . .	Boomerang (Australia) .	S.	735	230 0	27 0	8 3	2	3500	Elswick .	Bellis .	1889	49,962	4½	..	2 4·7-in. Q.F., 4 3-pr., 1 M.	3	20·0	100	91
2nd cl. Cr. .	Brilliant . .	S. shd.	3600	300 0	43 8	17 6	2	9164	Sheerness	Hawthorn.	1891	204,228	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·7	400	273
3rd cl. Cr. .	Brisk. . .	S.	1770	225 0	36 0	14 3½	2	3500	Glasgow	Thomson .	1886	87,583	..	..	6 6-in. Q.F., 8 3-pr., 2 M., 1 l.	3	16·5	325	172
1st cl. G. B. .	Bramble . .	~~S.~~	700	180 0	33 0	8 0	2	1300	Liverpool	Fawcett & Co.	1898	50,461	..	..	2 4-in., 4 12-pr. Q.F.	..	13·5	50	85
„ „ .	Britomart .	~~S.~~	700	180 0	33 0	8 0	2	1300	Liverpool	Fawcett & Co.	1898	50,401	..	..	2 4-in., 4 12-pr. Q.F.	..	13·5	50	85
Sloop . .	Buzzard . .	C.	1140	195 0	28 0	11 6	2	2000	Sheerness	Barrow .	1887	58,700	..	..	8 5-in., 8 M.	2	14·50	160	138
3rd cl. Cr. .	Calliope . .	S. shd.	2770	235 0	44 6	19 11	1	4020	Portsm'th	Rennie .	1884	120,000	..	1½	4 6-in., 12 5-in. 38-cwt., 10 M., 2 l.	2	14·6	550	293
„ „ .	Calypso . .	S. shd.	2770	235 0	44 6	19 11	1	4000	Chatham	Rennie .	1883	119,500							
2nd cl. Cr. .	Cambrian .	S. shd.	4360	320 0	49 6	19 0	2	9000	Pembroke	Hawthorn.	1893	236,919	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·5	400	312
3rd cl. Cr. .	Carysfort . .	S. shd.	2380	225 0	44 6	19 3	1	2000	Glasgow .	Elder .	1878	114,454	..	1½	2 90-cwt. M.L.R., 12 64-pr. do., 6 M., 2 l.	2	12·75	470	265
„ „ .	Champion .	S. shd.	2380	225 0	44 6	19 8	1	2000	Glasgow .	Elder .	1878	113,983	..	1½	4 6-in., 8 5-in., 4 3-pr., Q.F., 6 M., 2 l.	2	12·75	470	265

3rd cl. Cr.	Cleopatra	S. shd.	2380	225	0	44	6	19	3	1	2000	Glasgow	Humphrys	1878	113,924	..	1½	4 6-in., 8 5-in., 4 3-pr. Q.F., 6 M., 2 l.	2	13·0	470	265
" "	Comus	S. shd.	2380	225	0	44	6	19	3	1	2000	Glasgow	Elder	1878	113,974	..	1½	10 6-in., 8 M., 2 l.	2	12·75	470	265
" "	Conquest	S. shd.	2380	225	0	44	6	19	3	1	2000	Glasgow	Humphrys	1878	110,912	..	1½	9 6-in., 8 M., 2 l.	2	13·0	470	265
" "	Constance	S. shd.	2380	225	0	44	6	19	3	1	2000	Chatham	Penn	1880	110,000	..	1½	2 90-cwt. M.L.R., 12 64-pr., 6 M., 2 l.	2	13·0	470	265
" "	Cordelia	S. shd.	2380	225	0	44	6	19	3	1	2000	Portsm'th	Rennie	1881	104,500	..	1½	10 6-in., 10 M., 2 l.	2	12·75	470	265
Sloop	Condor	~~S.~~ shd.	980	180	0	32	6	11	6	2	1400	Sheerness	Thames	1898	59,379	..	..	6 4-in. Q.F., 4 3-pr.	..	13 2	130	130
2nd cl. Cr.	Charybdis	S. shd.	4360	320	0	49	6	19	0	2	9000	Sheerness	Earle	1893	237,344	4½	2–1	2 6-in. Q.F., 8 4·7-in, 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·5	400	312
T. G. B.	Circe	S.	810	230	0	27	0	8	9	2	3500	Sheerness	Penn	1892	61,979	4½	..	2 4·7-in. Q.F., 4 3-pdr.	3	19·25	100	91
2nd cl. G. B.	Cockchafer	C.	465	125	0	23	6	9	6	1	360	Pembroke	Maudslay	1881	77,000	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·8	40	61
3rd cl. Cr.	Cossack	S.	1770	225	0	36	0	14	3½	2	3500	Glasgow	Thomson	1886	x 87,583	..	..	6 6-in. Q.F., 8 3-pr., 2 M., 1 l.	3	16·5	325	172
1st cl. Cr.	Crescent	S. shd.	7700	360	0	60	0	23	9	2	12,000	Portsm'th	Penn	1892	383,068	6	5–1	1 9·2-in., 12 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	19·7	850	560
3rd cl. Cr.	Curaçoa	S. shd.	2380	225	0	44	6	19	3	1	2000	Glasgow	Humphrys	1878	112,931	..	1½	4 6-in., 8 5-in., 1 3-pr. Q.F., 9 M., 2 l.	2	13·0	470	265
G. V.	Curlew	S.	950	195	0	28	0	10	6	2	1200	Devonp'rt	Penn	1885	x 49,963	..	..	1 6-in. 3 5-in., 7 M.	1	14·5	250	103
Sloop	Daphne	C.	1140	195	0	28	0	11	6	2	2000	Sheerness	Greenock F'ndry Co.	1888	x 57,600	..	..	8 5-in., 8 M.	..	14·0	160	138
1st cl. Cr.	Diadem	S. shd.	11,000	435	0	69	0	26	0	2	16,500 B	Govan	Fairfield	1896	550,127	4½	3–6	16 6-in. Q.F., 14 12-pr., 12 3-pr., 2 12-pr. boat	3 (2 sub.)	20·5	1000	600
2nd cl. Cr.	Diana	S. shd.	5600	350	0	54	0	21	0	2	9600 B	Govan	Fairfield	1895	249,332							
" "	Dido	S. shd.	5600	350	0	54	0	21	0	2	9600 B	Glasgow	London and Glasgow Co.	1896	252,278	4½	2½	5 6-in. Q.F., 6 4·7-in., 9 12-pr., 1 3-pr., 4 M., 1 12-pr. boat.	3 (2 sub.)	20·0	550	470
" "	Doris	S. shd.	5600	350	0	54	0	21	0	2	9600 B	Barrow	Barrow	1896	254,029							
Sloop	Dolphin	C.	925	157	0	32	0	14	0	1	750	Middl'sbro	Hawthorn	1882	x 35,650	4½	..	2 6-in., 2 5-in., 3 M., 2 l.	..	11·3	135	115
T. G. B.	Dryad	S.	1070	250	0	30	6	9	0	2	3500	Chatham	Maudslay	1893	73,491	4½	..	2 4·7-in. Q.F., 4 6-pr.	3	19·0	100	120

x Includes Gun Mountings, &c.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					£	in.	in.			knots.	tons.	
1st cl. G. B.	**Dwarf**	S.	700	180	0	33	0	8	0	2	1300	Glasgow	London and Glasgow Co.	1898	51,139	..	..	2 4-in. Q.F., 4 12-pr.	..	13.5	50	85
2nd cl. Cr.	**Eclipse**	S. shd.	5600	350	0	53	0	20	3	2	9600 B	Portsm'th	Portsm'th	1894	279,345	4½	1½–3	5 6-in. Q.F., 6 4·7-in., 9 12-pr., 1 3-pr., 4 M., 1 12-pr. boat.	3 (2 sub.)	20·0	550	477
1st cl. Cr.	**Edgar**	S.	7350	360	0	60	0	23	9	2	12,000	Devonp'rt	Elder	1890	401,083	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·5	850	544
„ „	**Endymion**	S.	7350	360	0	60	0	23	9	2	12,000	Hull	Earle	1891	350,459							
Sloop	**Egeria**	C.	940	160	0	31	4	14	3	1	700	Pembroke	Humphrys	1873	42,882	..	..	4 20-pr., 2 M., 1 l.	..	11·3	100	122
1st cl. Cr.	**Europa**	S. shd.	11,000	435	0	69	0	26	0	2	16,500 B	Clydeb'nk	Thomson	1897	561,126	4½	4	16 6-in. Q.F., 14 12-pr., 12 3-pr., 7 M.	3 (2 sub.)	20·5	1000	600
3rd cl. Cr.	**Fearless**	S.	1580	220	0	34	3	14	6	2	3200	Barrow	Barrow	1886	*x* 87,452	..	..	4 5-in., 8 3-pr. Q.F., 2 M., 1 l.	3 (1 sub.)	16·7	450	147
2nd cl. G. B.	**Firebrand**	C.	455	125	0	23	6	10	0	1	360	Glasgow	Thomson	1877	22,800	..	..	2 5-in., 2 4-in., 2 M.	..	10·17	40	61
2nd cl. Cr.	**Flora**	S. shd.	4360	320	0	49	6	19	0	2	9000	Pembroke	Barrow	1893	241,819							
„ „	**Forte**	S. shd.	4360	320	0	49	6	19	0	2	9000	Chatham	Chatham	1893	240,816	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·5	400	312
„ „	**Fox**	S. shd.	4360	320	0	49	6	19	0	2	9000	Portsm'th	Portsm'th	1893	244,078							
„ „	**Forth**	S.	4050	300	0	46	0	20	0	2	5700	Pembroke	Hawthorn	1886	201,952	4	3–2	2 8-in., 10 6-in., 3 6-pr. Q.F., 8 3-pr., 6 M., 2 l.	2	16·8	900	326
„ „	**Furious**	S. shd.	5800	320	0	57	6	22	0	2	10,000 B	Devonp'rt	Earle	1896	280,772	4½	1–2	4 6-in. Q.F., 6 4·7 in., 8 12-pr., 8 3-pr., 1 12-pr. boat, 5 M.	2	19·0	500	480
„ „	**Gladiator**	S. shd.	5800	320	0	57	6	22	0	2	10,000 B	Portsm'th	Maudslay	1896	281,838							

1st cl. Cr.	Gibraltar	S. shd.	7700	360	0	60	0	23	9	2	12,000	Glasgow	Napier	1892	347,684	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	19·7	850	544
T. G. B.	Gleaner	S.	735	230	0	27	0	8	3	2	3600	Sheerness	Sheerness	1890	68,798	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	19·0	100	91
"	Gossamer	S.	735	230	0	27	0	8	3	2	3600	Sheerness	Sheerness	1890	54,490							
1st cl. G. B.	Goldfinch	C.	805	165	0	31	0	11	7½	1	1200	Sheerness	Sheerness	1889	40,889	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
1st cl. Cr.	Grafton	S.	7350	360	0	60	0	23	9	2	12,000	Blackwall	Humphrys	1892	351,851	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·0	850	560
T. G. B.	Grasshopper	S.	525	200	0	23	0	8	9	2	2700	Sheerness	Maudslay	1887	x 34,065	..	..	1 4-in., 6 3-pr. Q.F.	4	17·0	80	67
"	Halcyon	S.	1070	250	0	30	6	9	0	2	3500	Devonp'rt	Hawthorn	1894	75,091	4½		2 4·7-in. Q.F., 4 6-pr.	3	19·0	100	120
"	Harrier	S.	1070	250	0	30	6	9	0	2	3500	Devonp'rt	Hawthorn	1894	73,428							
1st cl. Cr.	Hawke	S.	7350	360	0	60	0	23	9	2	12,000	Chatham	Elder	1891	365,491	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·0	850	544
T. G. B.	Hazard	S.	1070	250	0	30	6	9	0	2	3500	Pembroke	Elder	1894	74,076	4½		2 4·7-in. Q.F., 4 6-pr.	3	19·0	100	120
"	Hebe	S.	810	230	0	27	0	8	9	2	3566	Sheerness	Sheerness	1892	73,433	4½		2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
T. D. S.	Hecla	I.	6400	391	7	38	9	24	3	1	2400	Belfast	Harland & Wolff	1878	126,190	..		4 64-pr. M.L.R., 1 5-in., 1 40-pr., 14 M.	4	13·0	2,200	277
2nd cl. Cr.	Hermes	S. shd.	5600	350	0	54	0	21	0	2	10,000 B	Glasgow	Fairfield	1898	278,349							
" "	Highflyer	S. shd.	5600	350	0	54	0	21	0	2	10,000 B	"	"	1898	278,186	4½	1½–3	11 6-in. Q.F., 15 smaller Q.F.	..	20·0	550	477
" "	Hyacinth	~~S.~~ shd.	5600	350	0	54	0	21	0	2	10,000 B	"	London and Glasgow Co.	1898	282,761							
" "	Hermione	S. shd.	4360	320	0	49	6	19	0	2	9000	Devonp'rt	Thomson	1893	223,267	4½	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr. 4 M., 1 l.	4	19·5	400	312

x Includes Gun Mountings, &c.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
																Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					£	in.	in.			knots.	tons.	
T. G. B. .	Hussar .	S.	1070	250	0	30	6	9	0	2	3500	Devonp'rt	Hawthorn .	1894	72,886	$4\frac{1}{2}$	..	2 4·7-in. Q.F., 4 6-pr.	3	19·0	100	120
Sloop .	Icarus .	C.	970	167	0	32	0	13	6	1	1200	Devonp'rt	Barrow .	1885	x 52,104	..	..	8 5-in., 4 3-pr. Q.F., 4 M. 1 l.	..	12·2	150	126
2nd cl. Cr.	Inconstant .	I. shd.	5780	337	4	50	3	25	6	1	4200	Pembroke	Penn .	1868	213,324	..	..	6 $6\frac{1}{2}$-ton M.L.R., 2 3-pr. Q.F., 11 M., 8 l.	..	16·20	750	631
„ „	Indefatigable .	S. shd.	3600	300	0	43	8	17	6	2	9000	Glasgow .	London and Glasgow Co.	1891	181,024							
„ „	Intrepid .	S. shd.	3600	300	0	43	8	17	6	2	9000	Glasgow .	London and Glasgow Co.	1891	181,157	$4\frac{1}{2}$	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	273
„ „	Iphigenia .	S. shd.	3600	300	0	43	8	17	6	2	9000	Glasgow .	London and Glasgow Co.	1891	181,879							
„ „	Iris . .	S.	3730	300	0	46	0	22	0	2	6000	Pembroke	Maudslay .	1877	213,186	..	..	13 5-in., 4 3-pr. Q.F., 8 M., 1 l.	3	18·0	780	450
„ „	Isis . .	S. shd	5600	350	0	54	0	21	0	2	9600 B	Glasgow .	London and Glasgow Co.	1896	252,067	$4\frac{1}{2}$	$2\frac{1}{2}$	5 6-in. Q.F., 6 4·7-in., 9 12-pr., 1 3-pr., 4 M., 1 12-pr. boat.	4 (2 sub.)	20·0	550	470
„ „	Juno . .	S. shd.	5600	350	0	54	0	21	0	2	9600 B	Barrow .	Barrow .	1895	254,097							
T. G. B. .	Jaseur .	S.	810	230	0	27	0	8	9	2	3711	Barrow .	Barrow .	1892	48,238	$4\frac{1}{2}$	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
„ .	Jason .	S.	810	230	0	27	0	8	9	2	3540	Barrow .	Barrow .	1892	49,253 x							
	[illegible]	S.	735	230	0	27	0	8	3	2	3500	Elswick .	Bellis .	1890	47,649	$4\frac{1}{2}$	..	2 4·7-in. Q.F., 4 3-pr.	3	20·0	100	91

	(Australia)										7500	Elswick .	Hawthorn .	1889	116,719	4½	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	4	19·0	800	217
G. V. .	Landrail .	S.	950	195	0	28	0	10	6	2	1200	Devonp'rt	Penn .	1886	49,963	..	..	1 6-in., 3 5-in., 4 3-pr. Q.F., 3 M.	..	14·5	250	46
1st cl. G. B.	Lapwing .	C.	805	165	0	31	0	11	7½	2	1200	Devonp'rt	Devonport	1889	39,952	..	..	6 4-in. 25-cwt., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
2nd cl. Cr.	Latona .	S.	3400	300	0	43	0	16	6	2	9000	Barrow .	Barrow .	1890	171,068	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
” ”	Leander .	S.	4300	300	0	46	0	20	6	2	5000	Glasgow .	Napier .	1882	148,453	..	1½	10 6-in. Q.F., 4 3-pr., 10 M., 2 l.	4	16·6	1000†	309
T. G. B. .	Leda .	S.	810	230	0	27	0	8	9	2	3597	Sheerness	Penn .	1892	62,145	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
G. V. .	Linnet .	C.	756	165	0	29	0	10	11	2	870	Blackwall	Rennie .	1880	35,663	..	..	2 90-cwt. M.L.R., 4 6-pr. Q.F., 2 M.	..	11·80	180	92
1st cl. G. B.	Lizard .	C.	715	165	0	29	0	11	10	1	1000	Belfast .	Harland .	1886	52,770	..	..	6 4-in., 4 M.	..	13·0	105	76
3rd cl. Crs.	Magicienne. Marathon.	S. shd.	2950	265	0	42	0	17	6	2	9000	Glasgow .	Hawthorn	1888	136,000	..	1½	6 6-in. Q.F., 9 6-pr., 1 3-pr., 3 M., 1 l.	4	19·0	400	218
1st cl. G. B.	Magpie .	C.	805	165	0	31	0	11	7½	1	1200	Pembroke	Earle .	1889	x 38,700	..	..	6 4-in., 4 M.	..	13·0	105	76
3rd cl. Crs.	Medea . Medusa .	S.	2800	265	0	41	0	16	6	2	9000	Chatham	Humphrys	1888	x 141,700	..	1½	6 6-in. Q.F., 9 6-pr., 1 3-pr., 3 M., 1 l.	4	19·0	400	218
2nd cl. Cr.	Melampus	S.	3400	300	0	43	0	16	6	2	9000	Barrow .	Barrow .	1890	171,635	4½	2–1	2 6-in. Q.F., 6 4·7 in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
Sloop .	Melita .	C.	970	167	0	32	0	13	6	1	1200	Malta .	Malta Dock Yard	1888	60,179	..	..	8 5-in., 8 M., 1 l.	..	12·50	150	125
3rd cl. Cr.	Melpomene	S. shd.	2950	265	0	41	0	17	6	2	9000	Portsm'th	Palmer Co.	1888	x 142,000	..	1½	6 6-in. Q.F., 9 6-pr., 1 3-pr., 3 M., 1 l.	4	19·0	400	218
2nd cl. Cr.	Mercury .	S.	3730	300	0	46	0	20	2	2	6000	Pembroke	Maudslay	1878	213,252	..	..	13 5-in., 6 3-pr. Q.F., 9 M., 1 l.	4	16·8	780	291

x Includes Gun Mountings, &c. † Bunker capacity.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					£	in.	in.			knots.	tons.	
2nd cl. Cr.	**Mersey**	S.	4050	300	0	46	0	19	6	2	6000	Chatham	Humphrys	1885	154,000	4	3–2	2 15-ton, 10 6-in., 3 6-pr. Q.F., 8 3-pr. 5 M., 2 l.	4	17·3	900	327
3rd cl. Cr.	**Mildura** (Australia)	S.	2575	265	0	41	0	15	6	2	7500	Elswick	Hawthorn	1889	116,062	4½	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	4	19·0	300	217
2nd cl. Cr.	**Minerva**	S. shd.	5600	350	0	53	0	20	6	2	9600 B	Chatham	Chatham	1895	244,046	4½	1½–3	5 6-in. Q.F., 6 4·7-in., 9 12-pr., 1 3-pr., 4 M., 1 12-pr. boat.	3 (2 sub.)	20·3	550	437
3rd cl. Cr.	**Mohawk**	S.	1770	225	0	36	0	14	6	2	3500	Glasgow	Thomson	1886	87,583	..	..	6 6-in. Q.F., 8 3-pr., 2 M., 1 l.	3	16·5	475	172
Sloop	**Mutine**	S.	980	180	0	33	0	11	6	2	1400	Laird	Laird	Bldg.	..	..	..	6 4-in. Q.F., 4 3-pr.	..	13·25	130	130
2nd cl. Cr.	**Naiad**	S.	3400	300	0	43	0	16	6	2	9000	Barrow	Barrow	1890	171,445	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
1st cl. Cr.	**Niobe**	S. shd.	11,000	435	0	69	0	26	0	2	16,500 B	Barrow	Vickers	1897	552,692	4½	3–6	16 6-in. Q.F., 14 12-pr., 12 3-pr., 2 12-pr. boat.	3 (2 sub.)	20·5	1000	600
Sloop	**Nymphe**	C.	1140	195	0	28	0	12	6	1	2000	Portsm'th	Greenock F'ndry Co.	1888	57,600	..	..	8 5-in., 8 M.	..	14·0	160	138
T. G. B.	**Niger**	S.	810	230	0	27	0	8	9	2	3784	Barrow	Barrow	1892	48,177	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
„	**Onyx**	S.	810	230	0	27	0	8	9	2	3548	Birkenh'd	Laird	1892	53,961							
3rd cl. Cr.	**Pallas**	S.	2575	265	0	41	0	15	6	2	7610	Portsm'th	Hawthorn	1890	148,828	4½	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	4	19·0	300	217
„ „	**Pearl**	S.	2575	265	0	41	0	15	6	2	7500	Pembroke	Earle	1890	151,693							
1st cl. G. B.	**Partridge**	C.	755	165	0	30	0	11	4	1	1200	Devonp'rt	Devonport	1888	37,800	..	..	6 4-in., 4 M.	..	13·25	105	76
„ „	**Peacock**	C.	755	165	0	30	0	11	4	1	1200	Pembroke	Barrow Co.	1888	37,600							
Sloop	Pelican	C.	1130	170	0	36	0	15	3	1	800	Devonp'rt	Humphrys	1872	56,221	..	..	2 6-in., 6 5-in., 4 M., 1 l.	..	10·6	180	145

3rd cl. Cr.	Pactolus	S.	2135	300	36	6	17	0	2	7000 B	Elswick	Penn	1897	139,736							
" "	Pandora	S.	2200	305	36	9	17	6	2	7000 B	Portsm'th	Portsm'th	Bldg.	153,468							
" "	Pegasus	S.	2135	300	36	6	17	0	2	7000 B	Jarrow	Palmer	1897	135,071							
" "	Pelorus	S.	2135	300	36	6	17	0	2	7000 B	Sheerness	Thomson	1896	164,810							
" "	Perseus	S.	2135	300	36	6	17	0	2	7000 B	Hull	Earle	1898	127,992							
" "	Pioneer	S.	2200	305	36	9	17	6	2	7000 B	Chatham	Fairfield	Bldg.	141,215	·22	2	8 4-in. Q.F., 8 3-pr., 2 l.	2	20·0	250	224
" "	Pomone	S.	2135	300	36	6	17	0	2	7000 B	Sheerness	Penn	1897	147,169							
" "	Prometheus	S.	2135	300	36	6	17	0	2	7000 B	Hull	Earle	1898	127,975							
" "	Psyche	S.	2200	305	36	9	17	6	2	7000 B	Devonp'r	Devonport	1898	155,563							
" "	Proserpine	S.	2135	300	36	6	17	0	2	7000 T	Sheerness	Devonport	1896	159,136							
" "	Pyramus	S.	2135	300	36	6	17	0	2	7000 B	Jarrow	Palmer	1898	135,096							
Sloop	Penguin	C.	1130	170 0	36	0	16	1	1	700	Glasgow	Hawthorn	1876	52,111	..	..	2 64-pr. M.L.R., 2 M., 1 l.	..	11·0	150	145
2nd cl. Cr.	Phaeton	S.	4300	300 0	46	0	20	6	2	5000	Glasgow	Napier	1883	145,198	..	1½	10 6-in. Q.F., 4 3-pr., 10 M., 2 l.	4	16·6	1000‡	309
1st cl. G. B.	Pheasant	C.	755	165 0	29	0	11	4	1	1200	Devonp'rt	Devonport	1888	x 37,800	..	..	6 4-in., 4 M.	..	13·25	105	76
3rd cl. Cr.	Philomel	S.	2575	265 0	41	0	15	6	2	7500	Devonp'rt	Earle	1890	156,102	4½	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	2	19·0	300	217
" "	Phœbe	S.	2575	265 0	41	0	15	6	2	7500	Devonp'rt	Devonport	1890	161,154							
Sloop	Phœnix	S. shd.	1050	185 0	32	6	11	3	2	1400	Devonp'rt	Devonport	1895	63,930	·22	..	6 4-in. Q.F., 4 3-pr., 3 M.	..	13·0	160	106
1st cl. G. B.	Pigeon	C.	755	165 0	30	0	11	4	1	1200	Pembroke	Barrow	1888	x 37,800							
" "	Pigmy	C.	755	165 0	30	0	11	4	1	1200	Sheerness	Barrow	1888	37,700	..	..	6 4-in., 4 M.	..	13·25	105	76
" "	Plover	C.	755	165 0	30	0	11	4	1	1200	Pembroke	Barrow	1888	37,700							
2nd cl. Cr.	Pique	S. shd.	3600	300 0	43	8	17	6	2	9000	Jarrow	Palmer	1890	184,108	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	273
T. Ram	Polyphemus	S.	2640	240 0	40	0	20	0	2	5500	Chatham	Humphrys	1881	174,450	..	3–2	6 6-pr. Q.F., 2 M.	5	18·0	300	..

* Includes Gun Mountings, &c.

‡ Bunker capacity.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					£	in.	in.			knots.	tons.	
3rd cl. Cr.	Porpoise	S.	1770	225	0	36	0	14	6	2	3500	Glasgow	Thomson	1886	87,583	..	..	6 6-in. Q.F., 8 3-pr., 2 M., 1 l.	3	16·5	475	172
1st cl. Cr.	Powerful	S. shd.	14,200	500	0	71	0	29	0	2	25,000 B	Barrow	Barrow	1895	674,879	6	3–6	2 9·2-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 9 M., 2 12-pr. boat	4	21·0	1500*	840
3rd cl. Cr.	Pylades	C.	1420	200	0	38	0	15	9	1	1400	Sheerness	Laird	1884	62,000	..	1¼	14 5-in., 8 M., 1 l.	..	12·6	400	170
Sloop	Racer	C.	970	167	0	32	0	14	0	1	850	Devonp'rt	Hawthorn	1884	49,000	..	..	8 5-in., 8 M., 1 l.	..	11·0	150	125
3rd cl. Cr.	Racoon	S.	1770	225	0	36	0	13	6	2	4500	Devonp'rt	Harland	1887	*x* 91,606	..	..	6 6-in. Q.F., 8 3-pr., 2 M., 1 l.	3	17·5	475	176
2nd cl. Cr.	Rainbow	S. shd.	3600	300	0	43	8	17	6	2	9681	Jarrow	Palmer	1891	184,086	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·7	400	273
" "	Raleigh	I. shd.	5200	298	0	49	0	24	7	1	4200	Chatham	Humphrys	1873	193,386	..	..	8 90-cwt. M.L.R., 8 6-in., 8 5-in., 12 M., 4 l.	2	13·9	550	571
2nd cl. G. Ves.	Rambler	C.	835	157	0	29	6	13	7	1	650	Glasgow	Elder	1880	37,038	..	..	2 20-pr., 1 M., 1 l.	..	10·66	40	160
3rd cl. Cr.	Rapid	C.	1420	200	0	38	0	15	9	1	1400	Devonp'rt	Maudslay	1883	68,226	..	1¼	2 6-in., 10 5-in., 4 M., 1 l.	..	12·6	400	171
1st cl. G. B.	Rattler	C.	715	165	0	29	0	11	0	1	1200	Elswick	Hawthorn	1886	*x* 38,734	..	..	6 4-in., 4 M.	..	13·6	105	76
T. G. B.	Rattlesnake	S.	550	200	0	23	0	8	0	2	2700	Birkenh'd	Laird	1886	*x* 35,425	..	..	1 4-in., 6 3-pr. Q.F.	4	18·5	100	67

2nd cl. G. B.	Raven	C.	465	125	0	23	6	10	0	1	360	Poplar	Rennie	1882	21,050	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·5	40	62
1st cl. G. B.	Redbreast	C.	805	165	0	31	0	11	7½	1	1200	Pembroke	Earle	1888	38,700	..	..	6 4-in., 4 M.	..	13·0	105	76
" "	Redpole																					
2nd cl. G. B.	Redwing	C.	461	125	0	23	6	10	0	1	360	Pembroke	Maudslay	1880	22,200	..	..	2 20-cwt., 2 M.	..	9·68	40	..
T. G. B.	Renard	S.	810	230	0	27	0	8	9	2	3500	Birkenh'd	Laird	1892	53,848	4½	..	2 4·7 in. Q.F., 4 3-pr.	3	19·25	100	91
2nd cl. Cr.	Retribution	S. shd.	3600	300	0	43	8	17	6	2	9000	Jarrow	Palmer	1891	183,975	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	275
Sloop	Rinaldo	S.	980	180	0	33	0	11	6	2	1400	Laird	Laird	Bldg.	..	..	..	6 4-in. Q.F., 4 3-pr.	..	13.25	130	130
3rd cl. Cr.	Ringarooma (Australia)	S.	2575	265	0	41	0	15	6	2	7500	Glasgow	Thomson	1890	128,076	4½	2–1	8 4·7-in. Q.F., 8 3-pr. Q.F., 4 M., 1 l.	4	19·0	300	216
1st cl. G. B.	Ringdove	C.	805	165	0	31	5	11	7½	1	1200	Devonp'rt	Devonport	1889	39,753	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
1st cl. Cr.	Royal Arthur	S. shd.	7700	360	0	60	0	27	9	2	12,000	Portsm'th	Maudslay	1891	402,414	6	5–1	1 9·2-in., 12 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	19·7	850	567
Sloop	Rosario	S. shd.	980	180	0	32	6	11	6	2	1400 B	Sheerness	Governm't	1898	65,578	..	..	6 4-in., 4 3-pr. Q.F.	..	13·2	130	130
3rd cl. Cr.	Royalist	C.	1420	200	0	38	0	15	9	1	1400	Devonp'rt	Maudslay	1883	68,173	..	1½	2 6-in., 10 5-in., 4 M., 1 l.	..	12·6	400	171
1st cl. Cr.	St. George	S. shd.	7700	360	0	60	8	23	9	2	12,000	Hull	Maudslay	1892	377,204	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	19·7	850	559
T. G. B.	Salamander	S.	735	230	0	27	0	8	3	2	3500	Chatham	Maudslay	1889	57,911	4½	..	2 4·7-in. Q.F., 4 3-pr. Q.F.	3	20·0	100	91
" "	Sandfly	S.	525	200	0	23	0	8	9	2	2700	Devonp'rt	Maudslay	1887	x 36,167	·22	..	1 4-in., 6 3-pr. Q.F.	4	19·0	80	67

x Includes Gun Mountings, &c.

* Bunker capacity, 3000.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft in.	ft. in.	no.					£	in.	in.			knots.	tons.	
2nd cl. Cr.	**Sappho**	S.	3400	300 0	43 0	16 6	2	9861	Poplar	Penn	1891	171,853	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·47	400	273
3rd cl. Cr.	**Satellite**	C.	1420	200 0	38 0	15 9	1	1400	Sheerness	Humphrys	1881	62,900	..	1¼	2 6-in., 6 5-in., 4 M., 1 l.	..	12·6	400	167
" "	**Scout**	S.	1580	220 0	34 0	14 6	2	3200	Glasgow	Thomson	1885	x 87,516	..	..	4 5-in., 8 3-pr. Q.F., 2 M., 1 l.	3 (1 sub.)	16·7	450	147
2nd cl. Cr.	**Scylla**	S.	3400	300 0	43 0	16 6	2	9280	Poplar	Penn	1892	171,593	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·62	400	273
T. G. B.	**Seagull**	S.	735	230 0	27 0	8 3	2	3500	Chatham	Maudslay	1889	56,922							
" "	**Sharpshooter**	S.	735	230 0	27 0	8 3	2	3500 B	Devonp'rt	Bellis	1888	x 50,029	4½	..	2 4·7-in., 4 3-pr. Q.F.	3	20·0	100	91
Sloop	**Shearwater**	S. shd.	780	180 0	32 6	11 6	2	1400	Sheerness	Thames Co.	Bld	..	..	..	6 4-in., 4 3-pr. Q.F.	..	13·2	130	130
T. G. B.	**Sheldrake**	S.	735	230 0	27 0	8 3	2	3500 B & W	Chatham	Maudslay	1889	57,800	4½	..	2 4·7-in., 4 3-pr. Q.F.	3	20·0	100	91
" "	**Skipjack**	S.	735	230 0	27 0	8 3	2	3500	Chatham	Laird	1889	59,531							
" "	**Spanker***	S.	735	230 0	27 0	8 3	2	3920 Du T.	Devonp'rt	Bellis	1889	50,000	4½	..	2 4·7-in., 4 3-pr. Q.F.	3	20·0	100	91
" "	**Speedwell**	S.	735	230 0	27 0	8 3	2	3500	Devonp'rt	Laird	1889	52,000							
1st cl. Cr.	**Spartiate**	S. shd.	11,000	435 0	69 0	26 0	2	16,500 B	Pembroke	Maudslay	1898	518,623	4½	3–6	16 6-in. Q.F., 14 12-pr., 12 3-pr., 2 12-pr. boat.	3 (2 sub.)	20·5	1000	600
2nd cl. Cr.	**Severn**	S.	4050	300 0	46 0	19 6	2	6000	Chatham	Humphrys	1885	x212,621	4	3–2	2 8-in., 10 6-in. Q.F., 3 6-pr., 2 3-pr., 10 M., 2 l.	..	17·3	900	327

2nd cl. Cr.	Sirius	S. shd.	3600	300	0	43	8	17	6	2	9000	Elswick	Maudslay	1890	186,649	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	273
„ „	Spartan	S. shd.	3600	300	0	43	8	17	6	2	9000	Elswick	Maudslay	1891	186,351							
1st cl. G. B.	Sparrow	C.	805	165	0	31	0	11	7½	1	1200	Greenock	Greenock	1889	39,000	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
T. G. B.	Speedy	S.	810	230	0	27	0	8	9	2	4703	Chiswick	Thornycrft	1893	58,927	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	20·21	100	91
„ „	Spider	S.	525	200	0	23	0	8	9	2	2700	Devonp'rt	Maudslay	1887	x 36,300	·22	..	1 4-in., 6 3-pr. Q.F.	4	19·0	80	67
2nd cl. G. B.	Starling	C.	465	125	0	23	6	10	0	1	360	Poplar	Rennie	1882	21,100	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·5	40	61
„ „	Stork	C.	465	125	0	23	6	10	0	1	360	Poplar	Rennie	1882	21,150	..	..	1 M., 2 l.	..	9·5	40	..
D. V.	Surprise	S.	1650	250	0	32	6	14	0	2	3000	Jarrow	Palmer	1885	x78,764	..	..	4 5-in., 4 6-pr. Q.F., 2 M.	..	17·0	400	114
Sloop	Swallow	C.	1130	195	0	28	0	11	6	2	1500	Sheerness	Rennie	1885	59,797	..	..	8 5-in., 8 M.	..	13·5	280	135
2nd cl. G. V.	Swift	C.	756	165	0	29	0	10	11	2	870	Blackwall	Rennie	1879	34,670	..	..	2 90-cwt. M.L.R., 4 6-pr. Q.F., 2 M.	..	11·81	180	92
2nd cl. Cr.	Sybille	S.	3400	300	0	42	0	16	6	2	9496	Stephenson.	Hawthorn.	1890	174,670	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
„ „	Talbot	S. shd.	5600	350	0	53	6	21	0	2	9600	Devonp'rt	Devonport	1895	273,856	4½	1½–3	5 6-in. Q.F., 6 4·7-in., 9 12-pr., 1 3-pr., 4 M., 1 l.	3 (2 sub.)	20·0	550	433
3rd cl. Cr.	Tartar	S.	1770	225	0	36	0	14	3½	2	3500	Glasgow	Thomson	1886	x 87,583	..	..	6 6-in. Q.F., 8 3-pr., 2 M., 1 l.	3	16·5	325	177
„ „	Tauranga (Australia)	S.	2575	265	0	41	0	15	6	2	7500	Glasgow	Thomson	1889	128,101	4½	2–1	8 4·7-in. Q.F., 8 3-pr. Q.F., 4 M., 1 l.	4	19·0	300	212

x Includes Gun Mountings, &c.

* Spanker: trial, 20 knots.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Lngth.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
2nd cl. Cr.	**Terpsichore**	S.	3400	300 0	43 0	16 6	2	9000	Glasgow	Thomson	1890	173,341	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 13-pr., 9 M., 1 l.	4	20·0	400	275
1st cl. Cr.	**Terrible**	S. shd.	14,200	500 0	71 0	27 0	2	25,000 B	Glasgow	Thomson	1895	681,419	6	3–6	2 9·2-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 9 M., 2 12-pr. boat.	4	22·4	3000	840
2nd cl. Cr.	**Thames**	S.	4050	300 0	46 0	19 6	2	5700	Pembroke	Penn	1885	205,452	4	3–2	2 8-in., 10 6-in., 3 6-pr. Q.F., 8 3-pr., 6 M., 2 l.	2	16·8	900	326
1st cl. G. B.	**Thistle**	S.	700	180 0	33 0	8 0	2	1300	Glasgow	London and Glasgow Co.	Bldg.	51,105	..	..	2 4-in. Q.F., 4 12-pr.	..	13·5	50	85
1st cl. Cr.	**Theseus**	S.	7350	360 0	60 0	23 9	2	12,000	Blackwall	Maudslay	1892	347,577	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·0	850	544
2nd cl. Cr.	**Thetis**	S.	3400	300 0	43 0	16 6	2	9000	Glasgow	Thomson	1890	173,146	4½	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
" "	**Tribune**	S.	3400	300 0	43 0	16 6	2	9000	Glasgow	Thomson	1891	173,006							
1st cl. G. B.	**Thrush**	C.	805	165 0	31 0	11 7½	1	1200	Greenock	Greenock F'ndry Co.	1889	39,000	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
Sloop	**Torch**	S. shd.	960	180 0	32 6	11 6	1	1400	Sheerness	Sheerness	1894	60,564	..	..	6 4-in. Q.F., 4 3-pr., 2 M.	..	13·25	130	..
2nd cl. Cr.	**Venus***	S. shd.	5600	350 0	54 0	21 2	2	9600	Glasgow	Elder	1895	249,938	4½	2½	5 6-in. Q.F., 6 4·7-in., 8 12-pr., 7 3-pr., 4 M., 1 12-pr. boat	3 (2 sub.)	19·5	550	470

Sloop .	Vestal .	S. shd.	780	180	0	32	6	11	6	2	1400 B	Sheerness	Govern'nt	Bldg.	..	..	..	6 4-in., 4 3-pr. Q.F.	..	13·2	130	130
2nd cl. Cr. .	**Vindictive** .	S.	5800	320	0	54	0	20	6	2	10,000	Chatham	Chatham .	1896	290,458	4½	1–2 N.S.	4 6-in. Q.F., 6 4·7-in., 8 12-pr., 3 3-pr., 1 12-pr. boat, 5 M.	2	19·5	500	450
2nd cl. Cr. .	**Volage** .	I. shd.	3080	270	0	42	0	22	0	1	2400	Blackwall	Ravenhill .	1874	132,817	..	..	10 6-in., 2 64-pr. M.L.R., 10 M., 2 l.	..	12·8	420	339
T. D. S. .	**Vulcan** .	S.	6620	350	0	58	0	23	0	2	12,032	Portsm'th	Humphrys	1889	370,447	4½	5–2½	8 4·7-in. Q.F., 12 3-pr., 16 M., 1 l.	6 (2 sub.)	20·0	1000	433
3rd cl. Cr. .	**Wallaroo** . (Australia)	S.	2575	265	0	41	0	15	6	2	7500	Elswick	Hawthorn.	1889	115,995	4½	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	4	19·0	300	218
1st cl. G. B. .	**Widgeon** .	C.	805	165	0	30	0	11	7½	1	1200	Pembroke	Rennie .	1889	39,315	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
2nd cl. G. B. .	**Wrangler** .	C.	465	125	0	23	6	10	6	1	360	Barrow .	Barrow .	1880	22,727	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·88	40	61
3rd cl. cr. .	3 New Ships .		(Design not yet settled)								..	Portsm'th, Chatham, Devonp'rt										
Sloop . .	2 New Ships .		(Design not yet settled)								..	Sheerness										

ϖ Includes Gun Mountings, &c.

* Venus: trial, 20·1 knots.

Paddle Wheel Vessels.—Adventure, Alecto, Cockatrice, Dove, Herald, Mosquito, Pioneer, Research (surveying vessel), Sphinx, Triton (surveying vessel).
Twin Screw Gun Boats (Iron).—Dee, Don, Esk, Medina, Medway, Sabrina, Slaney, Spey, Tay, Tees, Trent, Tweed, 373 tons; 320 to 410 I.H.P.
Twin Screw Iron or Steel Gun Boats (*Staunch Type*).—Ant, Arrow, Badger, Blazer, Bloodhound, Bonnetta, Bouncer, Bulldog, Bustard, Comet, Cuckoo, Fidget, Gadfly, Griper, Hyena, Insolent, Kite, Mastiff, Pickle, Pike, Pincher, Plucky, Scourge, Snake, Snap, Staunch, Tickler, Weasel, 180 to 254 tons; 130 to 270 I.H.P.

Royal Naval Reserved Merchant Cruisers.

—	Name.	Owners.	Length.	Breadth.	Draught of Water for the Admiralty List.	Gross Tonnage.	Indicated Horse-Power.	Ocean Speed.
			Feet.	Feet.	Feet.	Tons.		Knots.
Ships in receipt of an Annual subvention and permitted to fly the blue ensign.	**Campania**	Cunard Company	610	65	26	12,950	30,000	21
	Lucania	" "	610	65	26	12,950	30,000	21
	Himalaya	Peninsular and Oriental Co.	465½	52	22½	6,898	10,000	17
	Australia	" " "	465½	52	22½	6,901	10,000	17
	Victoria	" " "	466	52	22½	6,091	7,000	16
	Arcadia	" " "	466	52	22½	6,188	7,000	16
	Majestic 2 s.	White Star Company	565	58	24½	9,965	16,000	20
	Teutonic 2 s.	" "	565	58	24½	9,984	16,000	20
	Empress of India 2 s.	Canadian Pacific Railway Co.	440	51	24½	5,905	10,000	16
	Empress of China 2 s.	" " "	440	51	24½	5,905	10,000	16
	Empress of Japan 2 s.	" " "	440	51	24½	5,905	10,000	16
Ships held at the disposition of the Admiralty without subsidy.	**Etruria**	Cunard Company	501½	57	26	8,120	14,500	19½
	Umbria	" "	501½	57	26	8,128	14,500	19½
	Servia	" "	515	52	26	7,392	10,000	16½
	Gallia	" "	430	44½	24	4,809	5,300	15½
	Aurania	" "	470	57	27	7,269	9,500	17
	Britannic	White Star Company	455	45	25	5,004	5,200	16
	Germanic	" "	455	45	25	5,008	5,200	16
	Adriatic	" "	437	40½	23	3,888	3,600	15
	Britannia	Peninsular and Oriental Co.	466	52	22½	6,061	7,000	16
	Oceana	" " "	466	52	22½	6,188	6,000	16
	Peninsular	" " "	410½	48	..	5,000	4,972	15
	Oriental	" " "	410½	48	..	5,000	4,972	15
	Valetta	" " "	420½	45	22½	4,904	5,000	15
	Massilia	" " "	420½	45	22½	4,902	5,000	15
	Rome	" " "	430	44½	22½	5,545	5,500	15
	Carthage	" " "	430	44½	22½	4,879	5,000	15
	Ballarat	" " "	420	43	22½	4,748	4,500	14
	Parramatta	" " "	420	43	22½	4,756	4,500	14

There are also numerous ships on the Admiralty List complying with Admiralty conditions as to subdivision which have no national tie. They are suitable for receiving an armament, but there is no arrangement with Owners, except the promise of preference for occasional State employment.

GREAT BRITAIN, COLONIES, &c.—Cruising Ships, Gunboats, &c.

To what Government belonging.	Class of Ship.	Name.	Material of Construction.	Propellers.	Where Built.	When Launched.	Length.	Breadth.	Draught of Water.	Displacement.	Indicated Horse-Power.	Speed.	Coal Stowage.	Armament.
							ft. in.	ft. in.	ft. in.				tons.	
INDIA	T. G.B. .	Assaye .	Steel	2	Elswick	1891	230 0	27 0	8 3	735	3,500	19·0	100	2 4·7-in. Q.F., 4 3-pr. do., 1 f. tu. & 3 l. car.
INDIA	D. V. . .	Lawrence .	Steel	Pad.	B'kenh'd	1886	212 2	32 2	18 3	1,154	1,277	13·5	270	Four 4-in. B.L.R., 4 6-pr. Q.F., 4 M.
INDIA	T. G. B. .	Plassy .	Steel	2	Elswick	1890	230 0	27 0	8 3	735	3,500	19·0	100	2 4·7-in. Q.F., 4 3-pr. do., 1 f. tu. & 3 l. car.
QUE'NSLAND.	Gun-vessel	Gayundah	Steel	2	Glasgow	1884	115 0	25 0	10 0	450	400	10·0	..	One 8-in. 11½-ton; one 6-in. 4-ton; one 3-pr. Q.F.; 2 M.
QUE'NSLAND.	Gun-vessel	Paluma .	Steel	2	Glasgow	1884	115 0	25 0	10 0	450	340	10·0	..	One 8-in. 11½-ton; one 6-in. 4-ton; one 3-pr. Q.F.; 2 M.
SOUTH AUSTRALIA	Cruiser .	Protector .	Steel	2	..	1884	188 0	3 0	12 6	920	1,640	14·0	..	One 8-in. 11½-ton; five 6-in. 4-ton; five Gatlings.

The five second-class Cruisers, and the two Torpedo-Gunboats of the Australian Auxiliary Squadron, are included in the list of Ships of the Royal Navy, as well as the armour-clads Abyssinia, Cerberus, and Magdala.

ARGENTINE REPUBLIC.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Battery or Turret.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.					£	inches.	inches.	inches.			knots.	tons.	
c.b.	Almirante Brown	S.	4267	240 0	50 0	20 6	2	4500	Poplar	1880	190,000	9 (cp.)	8 (cp.)	1½	10 5·9-in. Q.F. (Canet), 4 4·7 in., 8 2·4 in., 2 M.	2	13·75	650	350
c.d.s.t.	Andes	I.	1558	186 0	44 0	9 6	2	750	Birkenhead	1875	85,600	6	9	1	2 11-in., 2 4·7-in., 4 M.	..	9·5	120	120
c.d.s.t.	Plata	I.	1558	186 0	44 0	9 6	2	750	Birkenhead	1874	85,600								
a.c.	Garibaldi	S.	6840	328 0	59 8	24 0	2	13,384	Sestri Ponente	1895	681,240	6 H.S.	6 H.S.	1½	2 10-in., 10 6-in. Q.F., 6 4·7 in., 10 2·2 in., 10 1·4 in., 2 M.*	4	19·9 (*t*)	1000†	500
a.c.	General Belgrano	S.	6882	328 0	59 8	24 0	2	13,000	Leghorn	1897	—	6 H.S.	6 H.S.	1½	2 10-in., 14 6-in. Q.F., 2 14-pr., 10 2·2-in., 8 1·4-in., 2 L., 2 M.	4 sub.	20·1	1000	500
c.d.s.b.	Independencia	S.	2336	230 0	44 4	13 0	2	3000	Birkenhead	1891	176,600	8 (cp.)	8 (cp.)	2	2 9·4-in., 4 4·7-in. Q.F., 4 3-pr., 4 M.	2	14·4	340	225
c.d.s.b.	Libertad	S.	2336	230 0	44 4	13 0	2	3000	Birkenhead	1890	176,600								
a.c.	Pueyrredon	S.	6832	328 0	59 8	24 0	2	13,000 B	Sestri Ponente	1898	—	6 H.S.	6 H.S.	1½	2 10-in., 10 6-in. Q.F., 6 4·7 in., 10 2·2-in., 10 1·4-in., 2 M.	4 sub.	20·1	1000	500
a.c.	San Martin	S.	6882	328 0	59 8	24 0	2	13,000	Leghorn	1896	664,600	6 H.S.	6 H.S.	1½	4 8-in. Q.F., 10 6-in., 6 4·7, 12 2·2, & 10 1·4 in., 2 L., 2 M.*	4 sub.	19·6 (*t*)	1100‡	500

* Armament of Garibaldi, San Martin, General Belgrano and Pueyrredon, and Q.F. guns of Libertad and Independencia are Armstrong.

† Bunker capacity.

ARGENTINE REPUBLIC.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
															Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.			knots.	tons.	
g.v.	**Argentina**	S.	820	192	0	27	0	13	0	1	850	Trieste	1883	25,500	..	..	1 6-in., 6 7-c.m. Krupp, 4 M.	..	12·0	220	120
cr.	**Buenos Aires**	S. shd.	4780	396	0	47	2	19	0	2	17,000	Elswick	1895	383,000	4½	1–5	2 8-in. Q.F. (Armstrong), 4 6-in. Q.F., 6 4·7-in. Q.F., 16 3-pr., 6 1-pr.	5	23·2*	1000†	429
to.g.b.	**Espora**	S.	520	210	0	25	0	8	0	2	3500	Birkenhead	1890	..	..	..	3 3-in. Q.F., 4 3-pr., 2 M.	5	20·0	100	124
cr.	**Nueve de Julio**	S.	3570	354	0	44	0	19	6	2	14,350	Elswick	1892	293,000	4½	4½	4 6-in. Q.F. (Armstrong), 8 4·7-in., 12 3-pr., 12 1-pr.	5	22·74	770†	300
cr.	**Patagonia**	S. & W.	1442	220	0	32	10	12	9	2	2400	Trieste	1885	100,000	..	1½	1 10-in., 3 6-in., 6 l., 10 M.	..	13·0	350	210
to.g.b.	**Patria**	S.	1070	250	0	31	0	10	0	2	4500	Birkenhead	1893	87,000	..	..	2 4·7-in. Q.F., 4 8-pr., 2 3-pr., 2 M.	5	20·75	288	159
g.v.	**Paraná**	I.	550	142	8	25	0	11	9	1	475	Birkenhead	1874	..	..	..	2 6-in., 2 4·7-in.	..	11·0	..	..
cr.	**25 de Mayo**	S.	3200	325	0	43	0	16	0	2	13,800	Elswick	1890	260,000	4½	4½	2 8·2-in. (Armstrong), 8 4·7-in. Q.F., 12 3-pr., 12 1-pr.	6	22·43	600†	185
g.v.	**Uruguay**	I.	550	142	8	25	0	11	9	1	475	Birkenhead	1874	..	..	..	2 6-in., 2 4·7-in.	..	11·0	..	..

Messrs. Laird have completed a training-ship (cruiser), Presidente Sarmiento, 2750 tons, 2000 I.H.P. (Niclausse boilers), and 13 knots speed, with nineteen guns and three torpedo-tubes; launched 1897. There are several other small gunboats; also the torpedo-ram Maipù (1063 tons, 1750 I.H.P.), built in England in 1880. The Florio Company has sold to the Argentine Government the steamships Arno, Regina Margherita, and Sempione to be converted into cruisers; and the Spanish firm of Pinillos, Salny & Co.; the Barcelona (4020 tons register), and Cadiz (4218 tons), which have been re-named Pampa and Gaucho.

* Natural draught. † Bunker capacity.

AUSTRIA-HUNGARY.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.					£	inches.	inches.	inches.			knots.	tons.	
c.d.s.	**Budapest** . .	S.	5550	305 0	55 9	21 0	2	9185 B	Trieste .	1896	349,600	10·6 H.S.	10·6 H.S.	2½ H.S.	4 9·4-in., 6 5·9-in. Q.F., 14 47-m.m. Q.F., 2 M.	4	17·8 (*t*)	500	..
c.b.	**Custoza** . . .	I.	7060	302 3	58 0	24 6	1	4440	Trieste .	1872	414,400	9	7	1½	8 10·2-in. (Krupp), 11 Q.F., 8 l.	2	14·0	584	567
a.c.	**Kaiser Karl VI.** .	S.	6250	367 6	56 0	20 4		12,800 B	Trieste .	1898	368,124	10·6 H.S.	9·8 H.S.	1½ H.S.	2 9·4-in., 8 5·9-in. Q.F., 18 1·8, 2 M.	4	20·0	800	450
c.b.	**Don Juan de Austria**	I.	3550	240 3	50 0	20	1	2700	Trieste .	1875	..	8	6	1	8 8·2-in. (Krupp), 11 Q.F. & M., 6 l.	4	13·0	380	440
c.d.s.	**Erzherzog Albrecht.**	I.	5940	285 2	56 3	22 0	1	3600	Trieste. .	1872	357,600	9	7	1½	8 9·4-in. (Krupp), 11 Q.F., 8 l.	2	13·0	453	535
c.b.	**Kaiser** . . .	W.	5810	254 0	58 3	24 3	1	3200	Pola . .	1871	337,200	6	5½		10 9-in. (Armstrong) M.L.R., 11 Q.F. & M., l.	..	13·0	450	540
a.c.	**Kaiserin Maria Theresia**	S.	5270	351 0	52 6	21 4	2	9755	Trieste .	1893	304,187	4	4	2	2 9·4-in., 8 5·9-in. Q.F., 18 1·8 Q.F., 2 2·7-in., 2 M.	4	19·0	740	450
c.b.	**Kaiser Max** . .	I.	3566	240 3	50 0	20 0	1	2700	Trieste .	1875	211,600	8	6	1	8 8·2-in. (Krupp), 11 Q.F. & M., 6 l.	4	13·0	380	440
Riv. Mon.	**Körös** . . .	S.	448	177 0	29 6	4 0	2	1250	Buda Pesth	1892	..	2	3	¾	2 4·7-in. Q.F., 2 l., 1 M. .		10·0	..	..
b.	**Kronprinz Rudolph**	S.	6940	295 0	62 4	25 3	2	7500	Pola . .	1887	330,000	12	10	2½	3 12-in. (Krupp), 6 4·7-in. Q.F., 11 smaller & M., 2 l.	4	16·0	600	492
b.	**Kronprinzessin Stephanie**	S.	5150	278 10	55 9	21 6	2	8300	Trieste .	1887	300,000	9	8	1	2 12-in. (Krupp), 6 5·9-in., 11 Q.F. & M., 2 l.	4	17·0	400	510
Riv. Mon. ”	**Leitha** . . **Maros** . . }	I. & S.	310	166 0	27 6	3 7	2	320	Buda Pesth	1871	20,000	1·7	2	1	1 4·7-in. Q.F., 2 M. . .	..	8·0	20	54
c.d.s.	**Monarch** . .	S.	5550	305 0	55 9	21 0	2	8900 T	Pola . .	1895	339,062	10·6 H.S.	10·6 H.S.	2½ H.S.	4 9·4-in., 6 5·9-in. Q.F., 14 47-m.m. Q.F., 2 M.	4	17·4 (*t*)	500	..
c.b.	**Prinz Eugen** . .	I.	3566	240 6	50 0	20 0	1	2700	Pola . .	1877	..	8	6	1	8 8·2-in (Krupp), 11 Q.F. & M., 6 l.	4	13·0	380	440
Riv. Mon.	**Szamos** . .	S.	448	177 0	29 6	4 0	2	1250	Buda Pesth	1892	..	2	3	¾	2 4·7-in. Q.F., 2 Q.F., 1 M. ,	..	10·0		
c.b.	**Tegetthoff** . .	I. & S.	7390	286 11	71 1	24 10	2	8800	Trieste .	1878 1893	..	14	14	3	6 9·4-in. (Krupp), 5 5·9-in. Q.F., 15 smaller do., 2 M.	4	16·3	670	578
c.d.s.	**Wien** . . .	S.	5550	305 0	55 9	21 0	2	8480 T	Trieste .	1895	337,850	10·6 H.S.	10·6 H.S.	2½ H.S.	4 9·4-in., 6 5·9 Q.F., 14 47-m.m. Q.F., 2 M.	4	17·6 (*t*)	500	..
c.d.s. *b.*	Unnamed I. . Unnamed II. . }	S.	8330	..	..	..	..	11,000 W.T.	..	Bldg.	480,000	..	..	..	3 9·4-in., 12 5·9-in. Q.F., 24 smaller.	..	18·0	..	..

AUSTRIA-HUNGARY.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			met. tns.	ft. in.	ft. in.	ft. in.					£	in.	in.			knots.	tons.	
corv.	**Aurora**	C.	1370	190 6	32 10	16 1	1	1000	Trieste	1873	..	..	..	2 4·7-in. (Wahrendorf), 5 l., 2 M. or Q.F.	..	11·0	160	200
to. cr. *to. cr.*	**"B." (Ersatz Helgoland)** **"C." (Ersatz Fasana)**	S. S.	2400 2300	301 10	39 6	14 2	2	7000	Pola	Bldg.	155,000	..	..	8 4·7-in. Q.F., 12 1·8-in.	1	20·0	..	..
to. g. b.	**Blitz**	S.	360	193 6	22 4	8 0	..	W.T. 3500	Elbing	1888	..	..	..	9 Q.F.	..	21·0	250	61
cr. 3rd cl.	**Donau**	C.	2344	230 0	42 8	19 8	1	1800	Pola	1893	..	..	..	10 4·7-in. (Uchatius), 4 M., 1 l.	..	12·0	320	..
cr. 3rd cl.	**Erzherzog Friedrich**	W.	1590	173 10	39 5	16 9	1	800	Venice	1874	..	..	..	10 5·9-in. (Wahrendorf), 1 l.	..	9·0	200	261
cr. 3rd cl.	**Fasana**	C.	2000	223 3	39 5	16 9	1	1700	Trieste	1870	..	..	..	4 5·9-in. (Krupp), 2 Q.F., 1 l.	..	12·0	315	260
cr.	**Frundsberg**	C.	1370	190 6	32 10	16 1	1	1000	Trieste	1873	..	..	..	2 5·9-in. (Wahrendorf), 5 l., 2 M. or Q.F.	..	11·0	160	209
to. cr.	**Greif Ersatz**	S.	200	..	..	..	..	..	..	Bldg.	143,780	..	..		..	..	..	..
cr. 2nd cl.	**Kaiserin Elizabeth**	S.	4064	321 6	47 6	18 7	2	9000	Pola	1890	..	3·5	2¼	2 9·4-in. (Krupp), 6 5·9-in. do., 11 Q.F., 2 l.	5	19·0	660	450
cr. 2nd cl.	**Kaiser Franz Joseph I.**	S.	4030	321 6	47 6	18 7	2	9000	Trieste	1889	..	3·5	2¼	2 9·4-in. (Krupp), 6 5·9-in. do., 11 Q.F., 2 l.	5	19·0	660	450
to. g. b.	**Komet**	S.	360	193 6	22 4	8 0	..	3500	Elbing	1888	..	..	..	9 Q.F.	..	21·0	..	61
cr. 2nd cl.	**Laudon**	C.	3430	253 0	46 0	20 8	1	2600	Trieste	1873	..	..	..	15 5·9-in. (Krupp), 7 Q.F. & M., 2 l.	..	13·0	450	497
cr. 3rd cl.	**Leopard**	S.	1582	224 0	34 0	14 0	2	6000	Elswick	1886	200,000	..	..	2 4·7-in. Q.F., 10 Q.F. & M.	4	18·3	250	148
to. g. b.	**Lussin**	S.	1011	200 4	26 3	12 2	2	1830	Trieste	1883	..	..	1½	2 5·9-in. (Krupp), 7 M., 1 l.	..	14·0	200	142
to. g. b.	**Magnet**	S.	510	219 10	26 10	8 0	2	Dürr. 6000	Elbing	1896	51,052	..	..	6 1·8-in. Q.F.	3	26·0t	105	..
to. g. b.	**Meteor**	S.	350	187 0	22 4	8 0	2	W.T. 3500	Elbing	1887	..	..	..	9 Q.F.	1	23.1	120	61
cr. 3rd cl.	**Panther**	S.	1582	224 0	34 0	14 0	2	6000	Elswick	1885	..	..	..	2 4·7-in. Q.F., 10 Q.F. & M.	4	18·5	250	148
to. deps.	**Pelican**	S.	2470	279 0	39 4	15 6	..	4600	Elbing	1891	..	..	..	2 5·9-in. (Krupp), 8 Q.F.	4	18·0	..	..
to. g. b.	**Planet**	S.	500	210 0	23 0	8 3	2	3500	Jarrow	1889	..	..	..	10 Q.F.	1	19·6	..	61
cr. 2nd cl.	**Radetzky** (Gunnery Ship)	C.	3450	253 0	46 0	20 8	1	2700	Trieste	1872	..	..	..	15 5·9-in. (Krupp), 7 Q.F. & M., 2 l.	..	14·0	450	497
cr. 3rd cl.	**Saida**	C.	2500	233 4	42 8	19 1	1	1800	Pola	1878	..	..	..	11 5·9-in. (Uchatius), 1 l.	..	12·0	320	299
to. g. b.	**Satellit**	S.	540	220 6	26 9	9 2	2	4000	Elbing	1893	..	..	1½	9 Q.F.	..	21·87	..	61
to. g. b.	**Sebenico**	S.	900	187 0	26 3	12 2	2	1380	Pola	1882	..	..	..	7 Q.F., 5 l.	..	14·0	200	142
cr. 3rd cl.	**Spalato**	S.	850	179 6	26 3	12 2	2	1200	Trieste	1879	..	..	..	7 Q.F., 5 l.	..	14·0	150	142
to. cr.	**Tiger**	S.	1684	233 0	32 10	15 5	2	5260	Trieste	1887	..	..	..	4 4·7-in., 10 Q.F.	..	18·0	300	190
to. g. b.	**Trabant**	S.	530	210 0	23 0	8 3	2	3500	Trieste	1890	..	..	..	10 Q.F.	1	20·0	..	61
to. v.	**Zara**	S.	850	179 6	26 3	12 2	2	1200	Pola	1879	..	..	..	7 Q.F., 5 l.	..	14·0	150	142
to. cr.	**Zenta**	S.	2250	312 0	39 6	14 2	2	7000	Pola	1897	143,780	..	..	8 4·7 Q.F., 12 1·8-in., 2 M.	1	20·0	..	..
corv.	**Zrinyi**	C.	1370	190 6	32 10	16 1	1	W.T. 1000	Trieste	1871	..	..	..	2 5·9-in. (Wahrendorf), 5 l., 2 M. or Q.F.	..	11.0	160	209

Four screw gunboats, between 540 and 870 tons displacement and 250 and 950 indicated horse-power.

BRAZIL.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Backing. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots.	tons.	
t. River	Alagoãs	W.	340	120 0	28 0	4 10	2	180	Brazil	1886	..	4½	4½	14½	1 7-in. M.L.R. (Whitworth), 2 M.	..	7·0	..	43
c.d.s., t.	Bahia	I.	1000	178 0	35 0	8 6	2	1640	Birkenhead	1865	..	4½	5½	10⅝	2 7-in. M.L.R. (Whitworth), 2 M.	..	6·0	..	125
t. River	Maranhao	S.	470	137 0	34 7	6 5	2	700	Rio de Janeiro	Bldg.	..	5 H.S.	..	..	2 4·7-in. Q.F., 1 2·5-in., 5 M.	..	12·0	..	..
c.d.s., t. / c.d.s., t.	Marshal Deodoro / Marshal Floriano	S.	3162	267 6	48 0	13 2	2	3400	La Seyne	1898 / Bldg.	..	13¾ H.S.	7¾–8¾ H.S.	1½	2 9·4-in., 2 5·9-in. howitzers, 4 4·7-in. Q.F., 2 M., 4 6-pr. and 2 1-pr.	2 (sub.)	15·0	236	200
t. River	Pará	S.	470	137 0	34 7	6 5	2	700	Rio de Janeiro	Bldg.	..	5 H.S.	..	..	2 4·7-in. Q.F., 1 2·5-in., 5 M.	..	12·0	..	..
t. River	Piauhy	W.	340	120 0	28 0	4 10	2	180	Brazil	1887	..	4½	4½	14½	1 7-in. M.L.R. (Whitworth)	..	7·0	..	43
t.	Riachuelo	S. shd.	5700	305 0	52 0	19 6	2	7300	Poplar	1883 R. 1895	365,000*	11 comp.	11 & 10 comp.	10 2″	4 9·2-in. (Whitworth, altered by Armstrong), 6 4·7-in., Q.F., 2 3-pr., 15 M.	5	16·71	800	450
t. River	Rio Grande	W.	340	120 0	28 0	4 10	2	180	Brazil	1888	..	4½	4½	14½	1 7-in. M.L.R. (Whitworth)	..	7·0	..	43
t.	24 de Maio (ex Aquidaban)	S shd.	4950	280 0	52 0	18 0	2	6200	Poplar	1885 R. 1897	345,000*	11	11½ & 10 cp.	10 2″	4 9·4-in. (Canet), 4 5·5-in., 2 Q.F., 13 M.	5	15·0	600	350

* Exclusive of guns and ammunition. The ship is undergoing reconstruction at Elswick.

Floating batteries, Brazil (1518 tons) and Lima-Barros (1444 tons).

BRAZIL.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.†	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.			knots.	tons.	
cr.	Almirante Tamandare.	S. shd.	4735	294 0	46 0	18 4	2	7500	Brazil	1890	..	..	1½	10 6-in. Q.F., 2 4·7-in., 8 M.	8	17·0	750	450
„	Andrada (ex America)	S. shd.	2600	252 8	34 0	18 0	1	3600	Bergen	1890	..	..	..	2 4·7-in. 2 14-pr. Q.F., 6 6-pr., 6 1-pr.	5	17·0	..	..
„	Barroso	S. shd.	3600	330 0	43 9	16 10	2	7500	Elswick	1896	..	4½	3	6 6-in. Q.F., 4 4·7-in., 10 6-pr., 4 1-pr., 4 M.	3	20·0	700	..
„	Benjamin Constant	S. shd.	2750	236 0	46 0	18 0	1	2800	La Seyne	1892	..	..	2	4 6-in. Q.F., 8 4·7-in., 8 M., 4 l.	4	14·0	260	287
to.cr.	Caramuru	S.	1030	249 6	30 9	10 2	2	6000	Kiel	1896	..	..	½	2 3·9-in. Q.F., 6 2·2-in., 2 1·4-in.	3	22·5	..	..
to.g.b.	Gustavo Sampaio	S.W.	500	197 0	21 0	7 9	2	2500	Elswick	1893	..	..	..	2 20-pr. Q.F., 4 7-pr. Q.F.	3	18·0	150	95
cr.	Parnahyba (Torpedo training.)	C.	838	170 6	26 3	11 2	1	900	Havre	1878	..	..	..	5 4·7-in., 4 M.	..	10·0	..	..
„	Paysandu (ex Guanabára)	W.	1900	200 0	41 2	16 4	1	3000	Brazil	1877	..	..	..	9 70-pr. M.L.R. (Whitworth), 6 M., 2 l.	..	13·0	..	250
cr.	Primeiro de Março	C.	726	167 3	26 3	10 6	1	750	Brazil	1881	..	..	..	7 4·5-in. M.L.R. (Whitworth), 4 M.	..	9·0	..	..
„	Quinze de Novembro (ex Republica)	S.	1300	210 0	35 0	13 0	2	3300	Elswick	1892	..	..	2–1	6 4·7-in. Q.F., 4 6-pr., 6 M.	4	17·0	170	160
to.cr.	Tamoyo	S.*	1080	269 0	28 10	9 10	2	6500	Kiel	1898	..	..	..	2 3 9-in. Q.F., 6 2·2-in., 2 1·4-in., 2 M.	3	23·0	293	110
„	Timbira	S.	1030	249 6	30 9	10 2	2	7000	Kiel	1896	..	..	½	2 3·9-in. Q.F., 6 2·2-in., 2 1·4-in., 2 M.	3	22·5	250	110
g.v.	Tiradentes	S. shd.	800	165 0	30 0	11 0	2	1200	Elswick	1892	..	..	..	4 4·7-in. Q.F., 3 6-pr., 4 M.	2	14·5	110	107
cr.	Tonelero (ex Trajano)	W.	1414	200 0	30 0	15 6	2	2400	Brazil	1873 / 1895	..	..	..	7 4·7-in. Q.F., 4 M.	..	13·0	..	..
„	Trinidade (ex Liberdade)	I.	250	101 8	21 8	10 10	2	280	Brazil	1884	..	..	..	2 l., 1 M.	..	10·0	..	..
to.cr.	Tupy	S.	1030	249 6	30 9	10 2	2	7000	Kiel	1896	..	..	½	2 3·9-in. Q.F., 6 2·2-in., 2 1·4-in., 2 M.	3	22·5	250	110

* Doubtful. † All the Q.F. guns above 6-pr. in Brazilian Navy are Armstrong.

Ten screw gunboats, 200 tons to 400 tons, and eight paddle gunboats, 120 tons to 160 tons.

CHILI.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots.	tons.	
c.b.	Almirante Cochrane	I.	3500	210 0	45 9	19 8	2	2920	Hull	1874	..	9	8	3″	6 8-in. (Armstrong), 4 6-pr. Q.F., 4 3-pr., 7 M.	3	13·0	500	242
a.o.	Almirante O'Higgins	S. shd.	8500	411 9	62 6	22 0	2	16,000 B	Elswick	1897	..	7	6	2	4 8-in. Q.F., 10 6-in., 4 4·7-in., 10 12-pr., 10 6-pr., 4 M.	3 (2sub.)	22·0	1200	..
b.	Capitan Prat	S. shd.	6900	328 0	60 8	21 10	2	12,000	La Seyne	1890	391,000	12 steel Schn.	10½ 4	3″	6 9·4-in. (Canet), 8 4·7-in. Q.F. (Canet), 6 2·2-in., 4 1·8-in., 10 1·4-in., 5 M.	4	18·3	400 1100	485
a.o.	Esmeralda	S. shd.	7020	436 0	53 2	22 3	2	18,000	Elswick	1896	..	6 H.S.		2	2 8-in. Q.F., 16 6-in., 8 12-pr., 2 3-pr., 4 M.	3 (2sub.)	23·0	550* 1350	..
t.	Huascar	I.	1800	200 0	35 0	15 6	1	1050	Birkenhead	1865	..	4½	5½ t	1½″	2 8-in. (Armstrong), 2 4·7-in. Q.F., 3 M., 4 l.	..	12·0	250	134

* Bunker capacity.

Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.			knots.	tons.	
to.g.b / to.g.b.	Almirante Condell / Almirante Lynch	S	750	240 0	27 6	10 6	2	4500 B	Birkenhead	1890	..	..	..	3 14-pr. Q.F., 4 3-pr., 2 M.	5	21·0	100	..
to.g.b.	Almirante Molinas	S.	~~1200~~	295 3	32 6	12 10	2	6000	..	Pro.	..	..	..	4 4·7-in. Q.F., 6 1·8-in., 4 1·4-in., 2 M.	4	22·0	200	..
„	Almirante Simpson	S.	812	240 0	27 6	10 6	2	4500	Birkenhead	1896	..	4½	..	2 4·7-in. Q.F., 4 3-pr.	3	21·5t	100	..
cr.	Blanco Encalada	S.	4400	370 0	46 6	18 6	2	14,500	Elswick	1893	..	..	4–1½	2 8-in., 10 6-in. Q.F., 12 3-pr., 10 1-pr.*	5	22·78	†900	..
„	General Baquedano (Training)	S.	2330	240 0	45 9	18‡ 0	1	2500 B	Elswick	1898	..	..	..	4 4·7-in. Q.F., 2 12-pr., 2 6-pr., 2 M., 1 l.	1	13·0	200	280
gv.	Magellanes	C.	800	190 0	28 0	14 9	2	1230	London	1874	..	..	..	2 6-in., 1 7-in. M.L.R., 6 M., 2 l.	..	11·0	300	100
cr.	Ministro Zenteno	S.	3600	330 3	43 9	16 10	2	..	Elswick	1896	..	..	..	8 6-in. Q.F., 10 6-pr., 4 1-pr.*	3	20·0	..	..
gv.	Pilcomayo	W.	790	171 0	27 4	..	1	180 (nom.)	Birkenhead	1874	..	..	..	2 70-pr. B.L.R. (Armstrong), 2 40-pr., 3 M.	..	9·0	125	125
cr. / „	Presidente Errázuriz / Presidente Pinto	S. shd.	2080	268 0	35 9	19 6	2	5400	La Seyne	1890	..	..	3½	4 6-in. Q.F. (Canet), 2 5-in., 4 2·2-in., 6 M.	3	19·0	200	171

Five Gunboats of 420 tons displacement and 7 to 10 ~~knots speed~~.

* Armstrong. † Bunker capacity. ‡ Mean draught.

CHINA.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches			knots.	tons.	
cr.	Foo-Ching	S.	2500	253 0	36 2	18 0	2	2400	..	1893	..	4½	4–2	3 5-in. Krupp, 4 M., 2 l.	..	16·0	..	..
to.g.b.	Fei-Ying	S.	850	257 2	28 6	12 6	2	4500 Y	Stettin.	1890	..	2	..	1 9-in. Krupp Q.F., 2 4-in., 4 1·4-in. Hotchkiss	..	21·0	75	90
cr.	Hai-Chi.	~~S.~~	4300	396 0	46 8	18 6	2	17000	Elswick.	1898	..	6	5	2 8-in. Q.F., 10 4·7-in., 12 3-pd.	5	24·0	100*	..
„	Hai-Shen	—								1898								
„	Hai-Shew	S.	2950	314 8	41 0	16 0	2	8000	Vulcan, Stettin.	1897	..	2 shields.	3	3 6-in. Krupp Q.F., 8 4-in., 6 1·4-in. Hotchkiss, 6 M.	3 (1sub.)	20·7 (*t.*)	220 (500)	244
„	Hai-Yung									1897								
„	Hai-Tien	S.	4300	396 0	46 8	18 6	2	17000	Walker.	1897	..	6	5	2 8-in. Q.F., 10 4·7-in., 12 3-pd.	5	24·0	100	..
„	Hi-Ying	S.	2200	253 0	36 2	18 1	2	2400	..	1895	..	..	..	2 8-in. Armstrong, 8 4·7-in. Q.F., 4 M.	1	21·0	..	..
„	Huan-Tái	C.	2110	260 0	36 0	20 0	1	1600	..	1886	..	..	..	3 7-in. Krupp, 7 40-pr., 4 M.	2	15·0	360	..
„	Kai-Chih	C.	2110	260 0	36 0	20 0	1	1600	..	1882	..	..	..	2 8·2-in., 6 5·9-in., 6 M., 5 l.	..	15·0	360	..
„	King-Ching	C.	2100	250 0	36 0	20 0	1	2400	..	1886	..	..	..	3 7-in. Krupp, 7 40-pr., 6 M.	2	14·5	360	..
„	Kwang-Ting	C.	1000	235 0	27 6	11 4	2	3400	..	1890	..	..	1	3 4·7-in. Q.F., 4 M., 2 l.	4	16·5	..	..
„	Nan-Schuin	S.	2200	253 0	36 2	18 1	2	2400	Kiel.	1884	..	..	..	2 8-in. Armstrong, 8 4·7-in. Q.F., 4 M.	1	14·5	600	..
„	Nan-Thin	S.	2200	253 0	36 2	18 1	1	2400	Kiel.	1883	..	..	..	2 8-in. Armstrong, 8 4·7-in. Q.F., 4 M.	1	15·0	600	..
„	Pao-Min	S.	1480	213 0	36 0	14 0	1	2400	..	1883	..	..	..	2 6-in. Armstrong, 6 5-in., 2 l.	..	9	300	..
g.b.	Tien-Sing	W.	200	105 0	20 4	7 0	2	340	..	1875	..	3	..	1 7-in. (Krupp)	..	10·0	..	..
to.g.b.	Two unnamed	S.	871	255 10	26 10	10 6	2	7000	Foochow	Bldg.	..	..	..	1 3·9-in. (Canet) Q.F., 3 2·5-in., 6 1·4-in.	2	23·0	..	..

The displacement of German-built ships in metric tons. An 1800-ton cruiser was launched at Foochow in 1896. * Coal capacity.

DENMARK.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.			Armament.		Speed.	Normal Coal Supply.	Complement.
															Belt.	Gun Position.	Deck Plating.	Guns.	Torpedo Tubes.			
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
c.d.s.,t.	**Gorm** . . .	I.	2344	231	0	40	0	14	0	2	1670	Copenhagen	1870	104,000	7	8	..	2 10-in. (Armstrong) M.L.R., 3 3·4-in. (Krupp), 4 M.	..	12·25	115	158
t.	**Helgoland** . .	I.	5347	257	6	59	2	18	8	2	4000	Copenhagen	1878	275,000	12	10	4	1 12-in. (Krupp), 4 10·2-in., 5 4·7-in., 10 M.	4	12·0	230	350
c.d.s.,t.	**Herluf Trolle** .	S.	3470	..		..		..		2	4200	Copenhagen	Bldg.	..	..	..	..	2 9·4-in., 1 16-in. Q.F. & M.	..	..	..	..
b.	**Iver Hvitfeldt** .	S.	3260	242	0	49	6	18	0	2	5100	Copenhagen	1886	200,000	12	8	2	2 10·2-in. (Krupp), 4 4·7-in., 12 M.	4	15·6	250	298
c.d.s.,t.	**Lindormen** . .	I.	2076	216	0	39	5	13	9	2	1560	Copenhagen	1868	93,000	5	5	..	2 9-in. (Armstrong) M.L.R., 3 3·4-in. (Krupp), 4 M.	..	12·0	120	140
c.b.	**Odin** . . .	I.	3083	237	0	50	0	15	6	1	2260	Copenhagen	1872	147,000	8	8	..	4 10-in. (Armstrong) M.L.R., 4 3·4-in. (Krupp), 7 M.	..	12·4	180	236
t.	**Skjold** . .	S.	2150	226	6	38	0	13	5	2	2200	Copenhagen	1896	..	9	8–4½	2	1 9·4-in., 3 4·7-in. (Krupp), 4 1·8-in. Q.F., 1 M.	4	13·0	..	..
T. S.	**Tordenskjold** † .	S.	2400	221	6	43	3	15	6	2	2600	Copenhagen	1880	138,900	..	8	4–2	1 14-in. (Krupp), 4 4·7-in., 8 M.	4	14·0	170	220
c.d.s.,t.	Unnamed* . . . (Herluf Trolle type)	S.	3317	..		..		..		..	..	Copenhagen	Bldg.	..	..	..	..	..	..	..	..	..

Esbern Snare (torpedo school-ship), 530 tons, 2-in. belt. Repaired 1895–6.

* Estimates of 1899–1900. † To be reconstructed.

DENMARK.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.			knots.	tons.	
g. v.	Absalon	I.	527	150	0	26	0	10	2	1	500	Blackwall	1862	..	2½	2½	4 3·4-in. (Krupp), 4 M.	..	10·0	65	70
„	Diana	W.	556	154	6	26	3	10	2	1	500	Copenhagen	1863	33,000	..	..	6 3·4-in. (Krupp), 2 M.	..	9·0	60	81
„	Falster	I.	356	111	0	28	10	7	6	2	510	Copenhagen	1873	33,000	..	..	1 10-in. (Armstrong) M.L.R., 2 3·4-in. (Krupp), 2 M.	..	9·8	20	35
cr.	Fyen	S. shd.	2596	226	6	45	6	18	1	1	2700	Copenhagen	1882	170,000	..	1½	18 5·9-in. (Krupp), 8 M.	2	13·0	290	407
3rd cl. *cr.*	Geiser	S.	1280	257	6	27	6	11	4	2	3000	Copenhagen	1892	..	..	1½	2 4·7-in. Q.F., 4 3·4-in., 6 M.	4	17·1	..	..
„	Heimdal	S.	1280	257	6	27	6	11	4	2	3000	Copenhagen	1894	..	..	1½	2 4·7-in. Q.F., 4 3-pr., 6 M.	4	17·5	..	..
„	Hekla	S.	1280	233	0	32	10	11	2	2	3000	Copenhagen	1890	..	..	1½	2 6-in. Q.F., 4 2·2-in., 6 M.	4	17·0	..	..
g. v.	Ingolf	I.	870	192	0	28	0	12	6	1	600	Copenhagen	1876	44,000	..	..	2 5·9-in. (Krupp), 4 3·4-in., 2 M.	..	10·5	130	117
g. v.	Möen	I.	356	111	0	28	10	7	6	1	523	Copenhagen	1875	..	..	..	1 10-in. (Armstrong) M.L.R., 2 3·4-in. (Krupp), 2 M.	..	9·2	20	35
corv.	Saint Thomas	W.	1572	224	0	33	0	17	0	1	1870	Copenhagen	1871	..	..	..	8 4·7-in. (Krupp), 6 M.	..	13·0	190	182
cr.	Valkyrien	S.	2900	268	0	43	6	18	0	2	5300	Copenhagen	1887 1896	..	..	2½	2 8·2-in. (Krupp), 6 5·9-in., 4 Q.F., 10 M.	5	17·0	450	300

Gunboats.—Five in number (*Lille Belt*, *Öresund*, *Store Belt*, *Grönsund*, *Guldborgsund*), of 150 to 240 tons, 200 to 400 I.H.P. *Dagmar* (training-ship), corvette, 1200 tons; *Hjaelperen* (mining), 280 tons; *Sleipnir* (ice-breaker), 1260 tons, 3000 I.H.P.

FRANCE.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.*	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
a.g.b.	**Achéron**	I. & S.	1721	181	0	40	4	11	10	2	1700	Cherbourg	1885	100,000	8	8	2½	1 10·8-in., 3 3·9-in. Q.F., 2 1·8-in., 4 M.	..	13·0	100	101
b.	**Amiral Baudin**	I. & S.	11,911	321	6	69	10	26	2	2	8320	Brest	1883 1899	600,000	21½	16½	4	2 14·6-in., 8 6 4-in. Q.F., 8 5·5-in., 16 1·8-in., 6 1·4-in.†	4	15·0	800	630
a.c.t.	**Amiral Charner**	S.	4792	348	0	46	0	19	2	2	8300 B	Rochefort	1893	353,200	3½	2	2	2 7·6-in., 2 5·5-in. Q.F., 4 2·5-in., 6 1·8-in., 6 1·4-in., M.	5	18·2	413	375
b.	**Amiral Duperré**	I. & S.	11,209	311	0	66	11	26	9	2	8120	La Seyne	1879	570,000	21½	15½	2¼	4 13·3-in., 1 6·4-in., 14 5·5-in., 11 Q.F., 18 M.	4	14·22	850	664
a.c.t.	**Amiral Pothuau**	S.	5360	370	6	50	2	21	0	2	10,398 B	Havre	1895	384,000	3⅛–2	9½	3⅝	2 7·6-in., 10 5·5-in. Q.F., 16 1·8-in., 8 1·4-in.		19·2 *t*	538	461
t.	**Amiral Tréhouart**	S.	6629	293	2	58	4	23	2	2	8500 B	Lorient	1893	593,100	17¾	14½	4	2 12-in., 8 3·9-in. Q.F., 4 1·8-in. Q.F., 4 1·4-in., 8 M.	2	15·76 *t*	300	337
a.c.	**Bayard**	W. & I.	6011	265	9	57	2	24	11	2	4538	Brest	1880	..	10	8	2	4 9·4-in., 2 7·6 in., 6 5·5-in., 2 2·5-in., 12 M.	2	14·0	500	450
t.	**Bouvet**	S.	12,200	401	2	70	3	27	6	3	14,000 B	Lorient	1896	1,100,770	15¾–8 N.S.	14½ N.S.	3½ N.S.	2 12-in., 2 10·8-in., 8 5·5-in. Q.F., 8 3·9-in., 12 1·8-in., 20 1·4-in.	4 (2 sub.)	18·2 *t*	621	621
t.	**Bouvines**	S.	6610	293	9	58	3	23	3	2	8400 D'A	La Seyne	1892	594,640	17¾	14½	4	2 12-in., 8 3·9-in. Q.F., 4 1·8-in., 10 1·4-in. M.	2	16·05	300	323
t.	**Brennus**	S.	11,395	361	0	67	0	26	3	2	14,000 B	Lorient	1891	991,767	15¾ comp.	15¾	4¾	3 13·4-in., 10 6·4-in. Q.F., 4 2·5-in., 8 1·8-in., 8 M.	4	17·1	800	696
a.c.t.	**Bruix**	S.	4754	365	3	46	0	19	10	2	9049 B	Rochefort	1894	409,622	3¾	3¾	2	2 7·6-in., 6 5·5-in. Q.F., 4 2·5-in., 4 1·8-in., 6 1·4-in., M.	4	18·3 *t*	406	391
b.	**Caïman** ‡	I. & S.	7239	278	3	59	0	24	7	2	6000	Toulon	1885	..	19½	9¾	3	2 10·8-in., 6 3 9-in. Q.F., 6 1·8-in., 2 M., 6 1·4-in.	4	14·5	400	332

* French ships in in nearly every case of 4-in. or thinner armour, and is of ordinary steel. † New armament.

t.	Carnot .	S.	12,008	382	2 70	6 27	3 2	16,800 t D'A	Toulon .	1894	1,070,088	17¾ 10¾	14½	2¾	2 12-in., 2 10·8-in., 8 5·5-in. Q.F., 4 2·5-in., 16 1·8-in., 10 1·4-in.	4 (2 sub.)	17·86 t	705	625
a.c.t.	Chanzy t .	S.	4933	348	0 46	0 19	2 2	8300 B	Bordeaux .	1894	360,000	3¾	2	2	2 7·6-in., 6 5·5-in. Q.F., 4 2·5-in., 6 1·8-in., 6 1·4-in., M.	4	19·0	413	375
t.	Charlemagne .	S.	11,275	385	6 66	6 27	6 3	14,500 B	Brest .	1895	1,096,432	15¾	15¾	3½	4 12-in., 10 5·5-in. Q.F., 8 3·9-in., 16 1·8-in., 10 1·4-in., 8 M.	4 (2 sub.)	18·1 t	680 1100	631
t.	Charles Martel.	S.	11,880	392	6 71	0 27	6 2	14,996 t D'A	Brest .	1893	1,092,830	17¾	15¾	3½	2 12-in., 2 10·8-in., 8 5·5-in. Q.F., 4 2·5-in., 14 1·8-in., 5 1·4-in.	6	18·1 t	677	632
a.g.b.	Cocyte . .	I. & S.	1714	181	10 40	4 11	10 2	1700	Cherbourg .	1887	100,000	8	8	2½	1 10·8-in., 2 3·9-in. Q.F., 2 1·8-in., 4 M.	..	13·0	100	101
c.b.	Colbert. . .	W.	8924	317	9 56	6 28	5 1	4652	Brest .	1875	..	8½	6¼	..	8 10·8-in., 2 9·4-in., 6 5·5-in., 2 Q.F., 14 M.	4	14 47	700	706
a.c.	Condé . .	S.	10,000	453	0 63	9 24	7 3	20,000 W.T.	Cherbourg	Bldg	808,600	6–5 H.S.	8, 5 H.S.	2	2 7·6-in., 8 6·4-in. Q.F., 6 3·9-in., 16 1·8-in., 6 1·4-in.	5 (2 sub.)	21·0	..	..
c.b. & b.	Courbet . .	I. & S.	10,808	312	0 67	0 25	0 2	8100†	Toulon .	1881 1899	800,000	15	9½	2½	4 10·8-in., 4 9·4-in., 6 5 5 in., 2 Q.F., 18 M.*	5	15·4	1000	669
a.c.	C 9 (Condé class) ‡	S.	10,014	453	0 63	9 24	7 3	20,500 W.T.	Brest .	Pro.	868,626	6 H.S.	..	..	2 7·6-in., 8 6·4-in. Q.F., 6 3·9-in., 2 2·5-in., 18 1·8-in., 6 1·4-in.	4 (2 sub.)	21·0	1590	..
a.c.	C 10 Do.	S.	10,014	453	0 63	9 24	7 3	20,500 W.T.	Brest .	Pro.	942,940	6 H.S.	..	..					
a.c.	Desaix . .	S. shd.	7700	426	6 58	4 24	4 3	17,100 B	St. Nazaire .	Bldg.	620,000	4	3½	2¾	10 6·4-in. Q.F., 10 1·8-in., 6 1·4-in.	2	21·0	880 1200	531
c.b. & b.	Dévastation .	I. & S.	10,704	312	0 67	0 25	0 2	8320	Lorient .	1879	..	15	9½	2½	4 10·8-in., 4 9·4-in., 6 5·5-in., 2 Q.F., 18 M.*	4	15·17	950	685
a.c.b.	Duguesclin . .	I. shd.	6210	266	0 57	6 25	3 2	3300	Rochefort .	1883	220,000	9	8 comp.	2	4 9·4-in., 1 7·6-in., 6 5·5-in., 1 3·5-in. Q.F., 10 M.	2	14·0	400	430
a.c.	DupetitThouars	S.	9517	452	9 63	8 24	7 3	19,600 B	Toulon .	Bldg.	804,600	6–3¾ H.S.	8, 3¾ H.S.	2	2 7·6-in., 8 6·4-in. Q.F., 4 3·9-in., 16 1·8-in., 6 1·4-in.	(2 sub.)	21·0	§ 1020	612
„	Dupleix . .	S. shd.	7700	426	6 58	4 24	4 3	17,100 B	Rochefort .	Bldg.	620,000	4	3½	2¾	10 6·4-in. Q.F., 10 1·8-in., 6 1·4-in.	2	21·0	880	531
„	Dupuy de Lôme	S.	6406	374	0 51	6 23	6 3	14,000	Brest .	1890	416,000	4	4	2	2 7·6-in., 6 6·4-in. Q.F., 12 2·5-in., 1·8-in., 8 M.	4	20·0	900	515

* New armament. † Has received new boilers. ‡ Estimates of 1899. § Including liquid fuel.

Reconstruction of Amiral Baudin to be completed 1899, Amiral Duperré 1901, Caïman 1900, Courbet 1899, Dévastation 1900.

FRANCE.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots.	tons.	
a.g.b.	**Flamme**	S.	1128	165 0	32 7	10 4	2	1500	Cherbourg	1885	68,000	10	4	2	1 9·4-in., 1 3·5-in., 4 M.	1	13·0	120	84
b.	**Formidable**	S.	12,165	321 6	69 6	26 2	2	9700*	Lorient	1885 1899	467,520	21½	17¾	3	2 14·6-in., 8 6·4-in. Q.F., 8 5·5-in., 9 1·8-in., 14 M.**	6	16·0	900	640
c.b. & b.	**Friedland**	I.	8994	317 0	58 0	29 11	1	4428	Lorient	1873	..	8	7	..	8 10·8-in., 8 5·5-in., 20 M.	4	13·3	800	676
c.d.s., t.	**Fulminant**	I. & S.	5965	248 0	57 9	21 4	1	4500	Cherbourg	1877	..	13	12	2	2 10·8-in., 4 1·8-in. Q.F., 6 M.	2	13·8	400	248
c.d.s., b.	**Furieux**	I. & S.	6019	247 10	59 0	21 9	2	5033 B	Cherbourg	1883	264,640	20	17¾	3½	2 9·4-in., 5 Q.F., 10 M.**	2	14·0	290	248
a.g.b.	**Fusée**	S. shd.	1142	165 0	32 7	10 4	2	1500	Lorient	1884	68,000	10	4	2	1 9·4-in., 1 3·5-in., 4 M.	1	13·0	120	84
t.	**Gaulois**	S.	11,275	385 6	66 6	27 6	3	14,500 B	Brest	1896	1,093,925	15¾	15¾	3½–1½	4 12-in., 10 5·5-in. Q.F., 8 3·9-in., 16 1·8-in., 10 1·4-in., 8 M.	6 (2 sub.)	18·0	680 / 1100	632
a.c.	**Gloire**	S.	10,000	453 0	63 9	24 7	3	20,000 W.T.	Lorient	Bldg.	808,600	6–5 H.S.	8, 5 H.S.	2	2 7·6-in., 8 6·4-in. Q.F., 6 3·9-in., 16 1·8 in., 6 1·4 in.	5 (2 sub.)	21·0	..	..
a.g.b.	**Grenade**	S. shd.	1089	165 0	32 7	10 4	2	1500	Lorient	1888	68,000	10	4	2	1 9·4-in., 1 3·5-in., 4 M.	1	13·0	120	84
a.c.	**Gueydon**	S.	9517	452 9	63 8	24 7	3	20,200 Nic.	Lorient	Bldg.	808,600	6–3¾ H.S.	8, 3¾ H.S.	2	2 7·6-in., 8 6·4-in. Q.F., 4 3·9-in., 16 1·8-in., 6 1·4-in.	2 (sub.)	21·0	‡ 1020 / 1600	612
t.	**Henri IV.**	S.	8948	354 3	72 10	23 0	3	11,500 Nic.	Cherbourg	Bldg.	800,000	(?)	(?)	(?)	2 10·8-in., 7 5·5-in. Q.F., 12 1·8-in. Q.F., 2 M.	2 (sub.)	17	725 / 1100	464
t. & b.	**Hoche**	I. & S.	10,997	333 0	65 7	27 3	2	11,300 B	Lorient	1886	700,000	18	16	3	2 13·4-in., 2 10·8-in., 8 5·5-in., Q.F., 8 Q.F., 12 M.	5	16·0	800	660
t.	**Iéna**	~~S.~~	12,052	400 9	68 2	27 6	3	15,500 B	Brest	1898	1,136,385	13¾–4¾ H.S.	..	2½	4 12-in., 8 6·4-in. Q.F., 8 3·9-in., 16 1·8-in., 5 1·4-in., 13 1·4-in. M.	4 (2 sub.)	18·0	820 / 1100	631
[illegible]	[illegible]	I. & S.	7231	279 10	59 0	23 6	2	6605	Lorient	1883	..	20	9¼	3	2 10·8-in., 6 3·9-in. Q.F., 6 [illegible]	4	14·8	400	332

t.	Jauréguiberry .	S.	11,824	364	0	72	10	27	9	2	15,800 D'A.	La Seyne .	1893	1,069,536	17¾	14½	2¾	2 12-in., 2 10·8-in., 8 5·5-in. Q.F., 4 2·5-in., 12 1·8-in., 8 1·4-in., 8 M.	6	18·07	700	625
a.c.	Jeanne d'Arc .	S.	11,270	469	2	63	8	26	7	3	28,000 Guyot	Toulon .	Bldg.	882,955	6–3 H.S.	(?)	2·2 H.S.	2 7·6-in., 8 5·5-in. Q.F., 12 3·9-in., 16 1·8-in., 8 1·4-in., 2 M.	2 (sub.)	23	1400 2100	626
c.d.s., t.	Jemmapes .	S.	6592	284	0	57	8	22	0	2	9250 D'A.	St. Nazaire .	1892	525,000	17¾–10	17¾	4–2¾	2 13·4-in., 4 3·9-in. Q.F., 4 1·8-in. Q.F., 10 1·4-in. M.	2	16·7	300	334
a.c.	Kléber . .	S. shd.	7700	426	6	58	4	24	4	3	18,000 Nic.	Bordeaux .	Bldg.	620,000	4	3½	2¾	10 6·4-in. Q.F., 10 1·8-in., 6 1·4-in.	2	21·0	880	531
a.c.	Latouche - Tréville	S.	4756	348	0	46	0	19	2	2	8300 B	Havre . .	1892	360,000	3⅜	3¾	2–1½	2 7·6-in., 6 5·5-in. Q.F., 4 2·5-in., 4 1·8-in., 6 1·4-in. M.	4	18·2	406	375
b.	Magenta . .	I. & S.	10,851	330	0	65	7	27	3	2	12,000	Toulon .	1890	760,960	18	16	3	4 13·4-in., 17 5·5-in. Q.F., 4 2·5-in., 12 1·8-in., 8 M.	3	16·25	800	660
b.	Marceau . .	I. & S.	10,850	330	0	65	7	27	3	2	14,000 Nic.	La Seyne .	1887	769,080	18	16	3	4 13·4-in., 17 5·5-in. Q.F., 4 2·5-in. and 12 1·8-in., 8 M.	6	16·4	800	660
t.	Masséna . .	S.	11,924	384	10	66	0	27	0	3	13,500 D'A.	St. Nazaire .	1895	1,100,400	17¾–9¾	15¼–15¾ H. S.	3½ H. S.	2 12-in., 2 10·8-in., 8 5·5-in. Q.F., 8 3·9-in., 12 1·8-in. and 12 1·4-in.	6 (2 sub.)	17·1 †	630	612
a.g.b.	Mitraille . .	S. shd.	1128	165	0	32	7	10	4	2	1500	Rochefort .	1886	70,000	10	4	2	1 9·4-in., 1 3·5-in., 4 M.	..	13·0	120	84
a.c.	Montcalm	S.	9517	452	9	63	8	24	7	3	19,600 W. T.	La Seyne .	Bldg.	..	6–3¾ H.S.	8, 3¾ H.S.	2	2 7·6-in., 8 6·4-in. Q.F., 4 3·9-in., 16 1·8-in., 6 1·4-in.	2 (sub.)	21·0	‡ 1020 1600	612
b.	Neptune .	I. & S.	10,983	330	0	65	7	27	3	2	12,000 B	Brest . .	1887	780,000	18	16	3	4 13·4-in., 17 5·5-in. Q.F., 4 2·5-in. and 12 1·8-in., 8 M.	5	16·02	800	660
c.d.s.	Onondaga . .	I.	2593	226	6	49	3	16	0	2	642	New York .	1863	..	5½	11¾	1	4 9·4-in., 4 M.	..	6·5	200	100
a.g.b.	Phlégéton .	I. & S.	1796	187	0	40	4	11	10	2	1700	Cherbourg .	1890	142,000	9	8	2	1 10·8-in., 1 5·5-in. Q.F., 4 1·8-in., 4 M.	..	12·4	72	101
c.b. & b.	Redoutable .	I. & S.	9437	318	2	64	8	25	6	2	6071	Lorient .	1876 1896	..	14	9½	2½	8 9·4-in., 6 3·9-in. Q.F., 2 Q.F., 12 M.**	4	14·66	1000	700
b.	Requin . .	I. & S.	7822	279	10	59	0	24	7	2	7000 Nic.	Bordeaux .	1885 1898	..	19½	9¾	3	2 10·8-in., 6 3·9-in. Q.F., 2 1·8-in., 6 1·4 in., 12 M.**	4	15·0	400	332

* Has received new boilers. † New armament, armour, and approximately reduced displacement given. ** New armament. ‡ Including liquid fuel.

Reconstruction of Formidable to be completed 1899, Furieux 1901, Hoche 1899, Indomptable 1900, Magenta, Marceau and Neptune 1901, Requin 1900.

FRANCE.—Armoured Ships—*continued.*

Class.	NAME.	Material.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons	
c.b. & b.	**Richelieu**	W.	9128	323	6	57	10	27	11	2	4240	Toulon	1873	..	8½	6½	..	6 10·8-in., 5 9·4-in., 8 5·5-in. 18 M.	4	13·11	900	720
t.	**Saint Louis**	S.	11,275	385	6	66	6	27	6	3	14,500 B	Lorient	1896	1,080,997	15¾ H.S.	3-15¾ H.S.	3½	4 12-in., 10 5·5-in. Q.F., 8 3·9-in., 16 1·8-in., 10 1·4-in., 8 M.	4 (2 sub.)	18·0	820 1150	631
a.g.b.	**Styx**	I. & S.	1796	187	0	40	4	11	10	2	1700	Cherbourg	1892	142,000	9	8	2	1 10·8-in., 1 5·5-in. Q.F., 4 1·8-in., 4 M.	..	13·0	72	101
t.	**Suffren**	S.	12,728	411	9	70	4	27	6	3	16,200 Nic.	Brest	Bldg.	..	..	..	..	4 12-in., 10 6·4-in. Q.F., 8 3·9-in., 20 1·8-in.	4 (2 sub.)	18·0	820 1100	..
a.c.	**Sully**	S	10,000	453	0	63	9	24	7	8	20,000 W. T.	Cherbourg	Bldg.	808,600	6–5 H.S.	8,5 H.S.	2	2 7·6-in., 8 6·4-in. Q.F., 6 3·9-in., 16 1·8-in., 6 1·4-in.	5 (2 sub.)	21·0	..	..
c.d.s., t.	**Tempête**	I. & S.	4869	248	0	57	9	16	9	1	2193	Brest	1876	..	13	12	2	2 10·8-in., 4 1·8-in. Q.F., 6 M.	2	11·7	200	197
b.	**Terrible**	I. & S.	7575	279	10	59	0	24	7	2	6230	Brest	1881 1899	..	19½	17¾	3	2 13·4-in., 6 3·9-in. Q.F., 2 1·8-in., 12 M.*	4	14·5	400	332
c.d.s., b.	**Tonnant**	I. & S.	5091	248	7	58	5	17	3	1	1935	Rochefort	1880	..	18	14½	3	2 13·4-in., 4 M.	..	11 5	200	197
c.d.s., t.	**Tonnerre**	I. & S.	5858	248	0	57	9	21	4	1	4165	Toulon	1875	..	13	12	2	2 10·8-in., 4 1·8-in. Q.F., 6 M.	2	14·01	400	249
c.b. & b.	**Trident**	W.	8857	317	9	56	4	29	1	1	5083	Toulon	1876	..	8½	6½	½	8 10·8-in., 2 9·4-in., 6 5·5-in., 2 Q.F., 14 M.	6	14·17	650	730
a.c.	**Turenne**	W. & I.	6349	265	9	57	2	23	11	2	4160	Lorient	1879	..	10	8	2	4 9·4-in., 2 7·4-in., 6 5·5-in., 12 M.	2	14·14	500	450
c.d.s., t.	**Valmy**	S.	6592	293	9	57	4	23	3	2	8954	St. Nazaire	1892	578,957	17¾	17¾	4	2 13·4-in., 4 3·9-in. Q.F., 4 1·8-in. 10 M.	2	16·7	300	297
a.c.	**Vauban**	I.	6208	267	9	57	3	24	0	2	4560	Cherbourg	1882	..	10	8	2	4 9·4-in., 1 7·6-in., 6 5·5-in., 12 M.	2	14·32	550	440
c.d.s., t.	**Vengeur**	I. & S.	4709	248	0	57	9	16	9	2	2030	Cherbourg	1878	..	13	12	2	2 12·5-in., 4 1·8-in. Q.F., 6 M.	2	10·83	200	107

FRANCE.—Cruising Ships, &c.

Class.	NAME.	Material.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
															Gun Position	Deck.	Guns.	Torpedo Tubes.			
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots.	tons.	
2nd cl. *cr.*	**Alger**	S.	4382	346	0	45	3	19	6	2	8254 B	Cherbourg	1889	280,000	..	3½	4 6·4-in. Q.F., 6 5·5-in., 10 other Q.F., 10 M.	4	19·61	860	325
g. v.	**Amiral Parseval**	W. & I.	869	197	6	28	0	12	2	1	918	Rochefort	1879	33,772	..	..	4 5·5-in., 4 M.	..	12·33	150	116
cr.	**Amiral Rigault de Genouilly.**	W.	1756	236	3	35	5	17	0	1	2043 B	Brest	1876	62,796	..	..	8 5·5-in., 8 M.	..	14·49	200	198
cr.	**Aréthuse**	W.	3665	277	6	43	6	21	9	1	4200	Toulon	1882	..	..	..	4 6·4-in., 22 5·5-in., 8 M.	..	14·0	500	474
g. v.	**Aspic**	C.	476	145	4	23	10	10	6	1	453	Rochefort	1880	..	..	..	2 5·5-in., 2 3·9-in.	..	10·3	50	80
to. g. b.	**Bombe**	S.	420	196	10	21	7	5	11	2	2000 D'A.	Havre	1885	..	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
2nd cl. *cr.*	**Bugeaud**	S.	3740	308	6	43	6	20	6	2	9000 B	Cherbourg	1893	308,650	2 shield	3	6 6·4-in. Q.F., 4 3·9-in., 8 1·8-in., 11 1·4-in.	6	18 9	587	358
g. v.	**Capricorne**	W.	483	148	4	23	10	10	5	1	443	Havre	1882	..	..	..	2 5·5-in., 2 3·9-in.	..	11·18	70	80
to. g. b.	**Casabianca**	S.	960	262	6	26	10	11	6	2	5200 D'A.	Bordeaux	1895	98,985	..	½	1 3·9-in. Q.F., 3 2·5-in. 5 1·8-in. 4 1·4-in.	..	22 0	116	143
2nd cl. *cr.*	**Cassard**	S.	3952	325	6	44	11	20	6	2	10,143 D'A.	Cherbourg	1896	318,712	2 shield	3	6 6·4-in., Q.F., 4 3·9-in., 10 1·8-in., 3 1·4-in., 2 M.	2	19·8	630	385
to. g. b.	**Cassini**	S.	958	262	6	27	4	11	6	2	5500 D'A.	Bordeaux	1894	98,500	..	½	1 3·9-in. Q.F., 3 2·5-in. 4 1·4-in.	2	21·2	110	118
2nd cl. *cr.*	**Catinat**	S. Shd.	4065	331	10	44	8	21	1	2	9000 B	Havre	1896	324,992	2 shield	3	4 6·4-in. Q.F., 10 3·9-in., 10 1·8-in., 4 1·4-in. M.	2	19·0	563	384
2nd cl. *cr.*	**Cécille**	I. & S.	5933	378	9	49	3	19	9	2	10,200	La Seyne	1888	299,666	..	4	8 6·4-in. Q.F., 10 5·5-in., 6 1·8-in., 14 M.	4	19·0	940	486
2nd cl. *cr.*	**Chasseloup-Laubat**	S.	3758	308	6	43	6	20	10	2	9000 D'A.	Cherbourg	1893	256,320	..	3	6 6·4-in. Q.F., 4 3·9-in., 8 1·8-in., 12 1·4-in. M.	6	19·25	587	358
1st cl. *cr.*	**Châteaurenault**	~~S.~~ Shd.	8018	442	10	55	9	24	6	3	23,000 N.S.	La Seyne	1898	606,656	2 shield	2½	2 6·4-in. Q.F., 6 5.5-in., 10 1·8-in.	..	23	1400 / 2100	625

FRANCE.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots.	tons.	
3rd cl. *cr.*	**Coëtlogon**	S.	1932	312	0	30	5	14	0	2	5800	St. Nazaire	1889	134,000	..	1½	4 5·5-in. Q.F., 3 other Q.F., 4 M.	5	19·3	200	190
g. v.	**Comète**	C.	495	151	6	24	9	10	6	1	631	Cherbourg	1884	..	..	..	2 5·5-in., 2 3·9-in., 2 M.	..	12.2	60	84
to. cr.	**Condor**	S.	1243	216	6	29	3	15	5	2	3800	Rochefort	1885 1896	80,000	..	1½	5 3·9-in. Q.F., 1 2·5-in., 6 M.	5	17·7	160	134
3rd cl. *cr.*	**Cosmao**	S.	1954	312	0	30	5	14	0	2	6000	Bordeaux	1888	133,000	..	1½	4 5·5-in. Q.F., 8 other Q.F., 4 M.	5	20·5	200	190
to. g. b.	**Couleuvrine**	S.	435	196	10	21	7	5	11	2	2047	Havre	1885	33,778	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
to. g. b.	**Dague**	S.	408	196	10	21	7	5	11	2	2000	Havre	1885	36,119	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
2nd cl. *cr.*	**D'Assas**	S.	4000	325	6	44	11	20	6	2	9500 D'A.	St. Nazaire	1896	292,682	2 shield	3	6 6·4-in. Q.F., 4 3·9-in., 10 1·8-in., 11 1·4-in.	2	19·25	630	393
2nd cl. *cr.*	**Davout**	S.	3017	297	6	40	0	17	6	2	8881	Toulon	1890	221,827	..	3	6 6·4-in. Q.F., 4 3·9-in., 4 2·5-in., 4 1·8., 6 M.	4	20·07	600	336
g. v.	**Décidée**	S.	645	184	8	26	3	12	2	1	1000 Nic.	Havre	Bld.	54,100	..	..	2 3·9-in. Q.-F., 4 2·5-in., 4 1·4-in.	..	13·0	99	99
1st cl. *cr.*	**D'Entrecasteaux**	S. shd.	8114	383	7	58	6	25	9	2	13,500	La Seyne	1896	667,740	10–2¾ H.S.	4	2 9·4-in., 12 5·5-in Q.F., 12 1·8-in.	6	19·2 *t*	650	521
2nd cl. *cr.*	**Descartes**	S. shd.	3990	326	0	42	4	21	4	2	9000 B	St. Nazaire	1894	334,725	..	1½	4 6·4-in. Q.F., 10 3 7-in., 8 1·8-in., 4 1·4-in.	2	21·0 *t*	552	386
cr.	**D'Estaing**	W. & I.	2435	262	5	37	5	18	8	1	3700	Brest	1879	84,718	..	..	15 5·5-in., 8 M.	..	15·31	300	264
3rd cl. *cr.*	**D'Estrées**	S. shd.	2452	311	8	39	4	17	8	2	8500 Nor.	Rochefort	1897	208,200	..	1½	2 5·5-in. Q.F., 4 3·9-in., 8 1·8-in., 2 1·4-in.	..	20·5	345 480	234
to. g. b.	**D'Iberville**	S.	967	262	6	27	0	11	2	2	5060 D'A.	St. Nazaire	1893	99,120	..	½	1 3·9-in. Q.F., 1 2·5-in., 4 1·4-in.	6	21·4	117	118
to. g. b.	**Dragonne** *	S.	410	196	10	21	7	5	11	2	2000	Havre	1885	36,074	..	..	4 5·5-in. Q.F., 3 M.	2	18·0	100	63
cr.	**Dubourdieu**	W.	3577	253	7	46	6	22	10	1	3300	Cherbourg	1884	154,553	..	..	4 6·4-in., 12 5·5-in., 10 M.	2	14·0	600	496
2nd cl. *cr.*	**Du Chayla**	S. shd.	3952	325	6	44	11	20	6	2	10,009 D'A.	Cherbourg	1895	315,835	2 shield	3	6 6·4-in. Q.F., 4 3·9-in., 10 1·8-in., 3 1·4-in., 2 M.	2	20·2 *t*	624	385

cr.	**Duguay-Trouin**	I. & W.	3593	296	3	43	4	20	6	1	4899	Cherbourg	1877	132,116	..	..	5 6 4-in., 5 5·5-in., 4 1·8-in. Q.F., 5 M.	2	15·9	700	311
g. v.	**Dumont d'Urville**	W.	889	201	11	28	6	13	8	1	1081	Havre	1878	33,602	..	..	4 5·5-in., 1 3·9-in., 1 2·5-in., 2 M.	..	11·6	200	116
to. g. b.	**Dunois (ex M 3)**	S.	896	256	0	27	10	12	8	2	7000 N.S.	Cherbourg	1897	123,383	..	..	6 2·5-in. Q.F., 6 1·8-in.	..	28·0	187	128
cr.	**Dupetit Thouars**	W.	2049	257	10	35	9	16	0	1	2018	Brest	1874	58,220	..	..	10 5·5-in, 8 M.	..	15·07	300	200
cr.	**Duquesne**	I. & W.	5986	333	5	50	3	25	6	1	6589	Rochefort	1876	221,570	..	..	7 6·4-in. Q.F., 14 5·5-in., 8 M.	..	16·8	900	550
cr.	**Éclaireur†**	I. & W.	1769	236	3	35	5	17	0	1	2050	Toulon	1877	16,232	..	..	8 5·5-in., 6 M.	..	15·0	200	195
to. cr.	**Epervier**	S.	1288	216	6	29	3	15	5	2	3200	Rochefort	1885	80,000	..	1½	5 3·9-in. Q.F., 1 2·5-in., 6 M.	5	17·6	160	134
g. v.	**Etoile**	C.	502	149	3	24	7	8	4	2	450	France.	1885	29,782	..	..	6 3·9-in., 1 2·5-in., 2 M.	..	10·0	60	77
cr.	**Fabert**	W.	2100	294	4	36	0	18	4	1	1107	Rochefort	1874	61,967	..	..	8 5·5-in., 4 M.	..	12·42	300	218
to. cr.	**Faucon**	S.	1239	216	6	29	3	15	5	2	3200	Toulon	1887	80,000	..	1½	5 3·9-in. Q.F., 1 2·5-in., 6 M.	5	18·0	150	134
to. g. b.	**Flèche**	S.	425	196	10	21	7	5	11	2	2000	Havre	1885	37,517	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
3rd cl. *cr.*	**Fleurus**	S.	1310	229	8	29	2	15	4	2	4000 Nic.	Cherbourg	1893	128,530	..	..	5 3·9-in. Q.F., 6 1·8-in., 4 M.	..	17·6 *t*	118	179
„ „	**Forbin**	S	1820	312	0	30	5	16	0	2	5700	Rochefort	1888	123,739	..	1½	4 5·5-in. Q.F., 8 other Q.F., 4 M.	5	20·6	200	190
cr.	**Forfait**	W. & I.	2464	249	4	38	0	18	0	1	2764	Toulon.	1879	77,019	..	..	15 5·5-in., 8 M.	..	13·44	400	264
cr.	**Foudre** (torpedo transport)	S.	6090	370	6	52	6	23	6	2	11,900 D'A. *t*	Bordeaux	1895	407,712	..	3½	10 3·9-in. Q.F., 4 2·5-in., 4 1·4-in.	..	19·9 *t*	840	410
2nd cl. *cr.*	**Friant**	S.	3739	308	6	43	6	20	10	2	9000 Nic.	Brest	1893	308,750	..	3	6 6·4-in. Q.F., 4 3·9-in. 8 1·8-in. 6 1·4-in.	2	18·19	587	358
g. v.	**Fulton**	W.	913	199	5	28	5	12	8	1	850	Lorient	1887	37,000	..	..	2 5·5-in., 1 3·9-in., 5 M.	..	13·0	160	116
„	**Gabès**	C.	493	151	6	24	9	10	6	1	450	Rochefort	1884	28,624	..	..	2 5·5-in., 2 3·9-in.	..	11·0	60	84
3rd cl. *cr.*	**Galilée**	S.	2317	330	2	34	6	17	10	2	6600 B	Rochefort	1896	208,152	2 shields	1½	4 5·5-in. Q.F., 2 3·9-in., 8 1·8-in., 8 1·4-in.	..	20·0	226	248
1st cl. *cr.*	**Guichen**	S. shd.	8277	436	4	54	10	24	7	3	24,000 D'A	St. Nazaire.	1897	611,945	2 shield	2½	2 6·4-in. Q.F., 6 5·5-in., 10 1·8-in.	..	23·0	1460	625

* Converted experimentally into a howitzer gunboat.

FRANCE.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.			knots.	tons.	
2nd cl. *cr.*	H. 4 †	S.	4000	393	9	44	8	..		..	15,000 W.T.	Rochefort	Pro.	350,655	..	..	8 3·9-in. Q.F., 12 1·8-in., 4 1·4-in.	4 (2sub.)	23·0	..	..
2nd cl. *cr.*	H. 5 †											Private Yd.	Pro.	346,261	..	..					
d. v.	Inconstant	W.	891	199	5	28	5	12	7	1	850	La Seyne	1886	37,000	..	..	2 5·5-in., 1 3·9-in., 5 M.	..	13·0	160	116
cr.	Iphigénie (Training ship)	W.	3431	244	6	46	6	22	4	1	2800	..	1881	115,323	..	..	6 6·4-in., 2 3·5-in., 10 M.	1	14·6	400	391
3rd cl. *cr.*	Infernet	S shd.	2452	311	8	39	4	15	6	2	8500 Nor.	Bordeaux	Bldg.	193,000	..	..	2 5·5-in. Q.F., 4 3·9-in. 8 1·8-in.	..	20·5	345 / 480	234
2nd cl. *cr.*	Isly	S.	4477	346	0	43	6	19	6	2	8100	Brest	1891	252,760	..	3	4 6·4-in. Q.F., 6 5·5-in., 14 2·5-in. and 1·8-in., 8 M.	5	18·3	880	332
2nd cl. *cr.*	Jurien de la Gravière (D 2)	S. shd.	5500	440	0	48	8	22	0	3	17,000 Guyot	Lorient	Bldg.	481,000	..	3	8 6·4-in. Q.F., 12 1·8-in.	2	23·0	600 / 900	511
2nd cl. *cr.*	Jean Bart	S.	4109	346	0	43	6	19	6	2	8000	Rochefort	1889	283,240	..	4	4 6·4-in. Q.F., 6 5·5-in., 14 2·5-in., and 1·8-in., 8 M.	5	19·0	940	332
g. v.	Kersaint	S. shd.	1243	226	0	34	5	15	0	1	2200	Rochefort	1897	107,933	..	..	1 5·5-in. Q.F., 5 3·9-in., 7 1·4-in.	..	15·0	199	110
to. g. b.	Lahire (ex M 4)	~~S.~~	896	256	0	27	10	12	9	2	7000 N.S.	Cherbourg	1898	123,383	..	..	6 2·5-in. Q.F., 6 1·8-in.	..	23·0	137	128
3rd cl. *cr.*	Lalande	S.	1926	311	6	31	2	14	0	2	6000	Bordeaux	1888	183,800	..	1½	6 5·5-in. Q.F., 8 other Q.F., 4 M.	5	22·0	200	190
to. g. b.	Lance	S.	402	196	10	21	7	5	11	2	2000 Du T.	Havre	1886	39,964	..	..	4 1·8-in., Q.F., 3 M.	2	18·0	100	63
cr.	Lapérouse *	W. & I.	2372	262	5	37	5	18	8	1	2280	Brest	1877	85,347	..	..	15 5·5-in., 8 M.	..	14·73	300	264
„	Lavoisier	S.	2317	330	2	34	6	17	10	2	6400 B	Rochefort	1897	202,024	2 shield	1½	4 5·5-in. Q.F., 2 3·9-in., 8 1·8-in., 2 1·4-in., 4 M.	2	20·0	226	248
to. g. b.	Léger	S.	517	197	0	23	0	10	6	2	2360 B	Lorient	1891	52,000	..	..	1 3·9-in. Q.F., 3 2·5-in., 4 1·4-in.	3	18·8	130	69

to. g. b.	**Lévrier**	S.	505	197	0	23	0	10	6	2	2240 B	Lorient	1891	52,000	..	..	1 3·9-in. Q.F., 3 2·5-in., 4 1·4-in.	3	18·5	130	69
3rd cl. *cr.*	**Linois**	S.	2345	321	6	34	6	17	5	2	6600	La Seyne	1894	163,014	3·9	1½	4 5·5-in. Q.F., 2 3·9-in., 8 1·8-in., 4 1·4-in., 4 M.	4	20·5	200	248
g. v.	**Lion.**	C.	503	151	6	24	9	10	6	1	576	Havre	1884	23,146	..	..	2 5·5-in., 4 M.	..	11·8	70	84
"	**Lutin**	C.	493	141	9	23	11	9	4	1	373	Cherbourg	1877	20,295	..	..	2 5·5-in., 2 3·9-in.	..	10·0	60	77
"	**Lynx**	C.	485	141	9	23	11	9	4	1	427	Cherbourg	1878	21,478	..	..	2 5·5-in., 2 3·9-in.	..	10·38	60	77
"	**Météore**	C.	504	151	6	24	9	10	6	1	434	Cherbourg	1886	26,262	..	..	2 5·5-in., 3 M.	..	10·0	70	77
3rd cl. *cr.*	**Milan**	S.	1733	303	2	32	10	14	7	2	3986 B	St. Nazaire	1886	89,058	..	..	5 3·9-in. Q.F., 8 M.	2	18·1	400	186
cr.	**Naiade**	I. shd.	3686	246	0	47	2	22	10	1	2700	Toulon	1881	128,275	..	..	2 6·4-in., 18 5·5-in., 10 M.	..	13·68	500	490
cr.	**Nielly**	W. & I.	2100	262	5	37	5	18	8	1	2921	Brest	1880	84,037	..	..	15 5·5-in., 8 M.	..	15·23	300	264
g. v.	**Papin**	W. & I.	891	199	6	28	6	13	7	1	855	La Seyne	1886	37,000	..	..	2 5·5-in., 1 3·9-in., 5 M.	..	13·0	160	116
2nd cl. *cr.*	**Pascal**	S.	4015	326	0	42	4	21	4	2	9000 *t*, B	Toulon	1895	322,321	..	1½	4 6·4-in Q.F., 10 3·9-in., 8 1·8-in., 4 1·4-in. M.	2	20·0 *t*	650	378
cr.	**Primauguet**	W. & I.	2447	262	5	37	5	18	8	1	2268	Rochefort	1882	108,592	..	..	15 5·5-in., 8 M.	..	14·50	300	264
2nd cl. *cr.*	**Protet**	~~S.~~ shd.	4055	331	10	44	8	21	1	2	9300 *t*, B	Bordeaux	1898	324,992	2 shield	2½	4 6·4-in. Q.F., 10 3·9-in., 10 1·8-in., 2 1·4-in.	2	20·2 *t*	563	384
cr.	**Roland**	W.	2476	249	4	38	0	17	7	1	2294	Cherbourg	1882	84,184	..	..	15 5·5-in., 8 M.	..	14·50	350	264
to. g. b.	**Sainte Barbe**	S.	437	196	10	21	7	5	11	2	2000	Rouen	1885	43,233	..	1½	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
"	**Salve**	S.	413	196	10	21	7	5	11	2	2000	Rouen	1886	42,538	..	1½	4 1·8-in. Q.F., 3 M.	2	18·0	100	63

* Driven ashore in a gale and lost at Fort Dauphin, Madagascar, July 31, 1898.

† Estimates of 1899.

FRANCE.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length. ft.	Length. in.	Beam. ft.	Beam. in.	Draught. ft.	Draught. in.	Propellers.	Indicated Horse-Power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.			knots.	tons.	
g. v.	**Scorpion**	C.	505	151	6	24	9	10	6	1	511	Havre	1883	23,459	..	..	2 5·5-in., 3 M.	..	11·0	70	84
2nd cl. *cr.*	**Sfax**	S.& W.	4728	288	9	49	3	24	9	2	6522	Brest	1884 1898	200,000	..	1½	6 6·4-in. Q.F., 10 5·5-in., 6 1·8-in., 6 1·4-in., 4 M.†	2	16·84	715	473
2nd cl. *cr.*	**Suchet**	S.	3334	318	3	43	6	17	6	2	9000	Toulon	1893	226,360	..	3	4 6·4-in. Q.F., 4 3·9-in., 4 1·8-in., 12 1·4-in., 6 M.	7	20·0	480	246
3rd cl. *cr.*	**Surcouf**	S.	2044	312	0	30	5	14	0	2	6000	Cherbourg	1888	131,200	..	1½	4 5·5-in. Q.F., 8 other Q.F., 4 M.	5	20·5	200	190
g. v.	**Surprise**	S.	627	184	8	24	7	12	3	1	853 *t*	Havre	1895	50,954	..	..	2 3·9-in. Q.F., 4 2·5-in., 4 1·4-in.	..	13·4 *t*	73	99
1st cl. *cr.*	**Tage**	S. shd.	7589	390	0	53	8	22	10	2	12,410	St. Nazaire	1886	93,857	..	..	8 6·4-in., 10 5·5-in., 2 2·5-in., 6 Q.F., 14 M.	7	19·0	1000	400
2nd cl. *cr.*	**Tourville***	I. & W.	5576	333	5	50	3	25	4	1	7466	La Seyne	1876	271,499	..	..	7 6·4-in. Q.F., 14 5·5-in., 8 M.	..	16·89	800	550
3rd cl. *cr.*	**Troude**	S.	2026	311	6	31	2	14	0	2	6000	Bordeaux	1888	33,383	..	1½	4 5·5-in. Q.F., 8 other do., 4 M.	5	20·9	200	190
t. g. b.	**Vautour**	S.	1235	216	6	29	3	15	5	2	3391	Toulon	1886	87,733	..	1½	5 3·9-in. Q.F., 1 2·5-in. do., 6 M.	5	17·3	150	134
g. v.	**Vipère**	C.	486	145	4	23	10	10	6	1	441	Rochefort	1881	26,835	..	..	2 5·5-in., 2 3·9-in.	..	10·3	60	80
"	**Voltigeur**	W. & I.	943	199	5	28	5	12	7	1	999 B	Brest	1878	23,077	..	..	4 5·5-in., 4 M.	..	12·48	150	116
t. g. b.	**Wattignies**	S.	1292	230	0	29	3	15	0	2	4189	Rochefort	1891	111,000	..	..	5 3·9-in. Q.F., 6 1·8-in., 7 1·4-in., M.	4	18·61	160	180
g. v.	**Zelée**	S.	646	185	6	26	0	10	6	1	1000 Nic.	Rochefort	Bldg.	..	..	..	2 3·9-in. Q.F., 4 2·5-in., 4 1·4-in.	..	13·0	..	75

* New engines, 1893. † New armament.

Merchant Cruisers (Auxiliary to French Navy).

To what Company belonging.	Name.	Register Tonnage.	Length.	Beam.	Depth.	H.P. (nominal.)	Speed.	When built.
		Tons.	Feet.	Feet.	Feet.		Knots.	
Compagnie Générale Transatlantique	**La Touraine**	8893	520·2	56·0	34·6	1616	19	1890
	Duc de Bragance	2096	331·6	34·2	16·8	426	17½	1889
	Eugène Pereire	2078	334·6	35·1	23·9	437	17½	1888
	Général Chansy	2299	341·2	35·7	15·5	478	17½	1891
	La Bretagne	7112	495·4	51·8	34·5	1149	17½	1886
	La Champagne	7087	493·4	51·8	34·5	1149	17½	1885
	La Gascogne	7395	495·4	52·2	34·8	1308	17½	1886
	Maréchal Bugeaud	2206	342·5	34·1	23·0	482	17½	1890
	Ville d'Alger	2211	342·7	36·1	23·0	208	17½	1890
	La Navarre	6648	471·0	50·5	36·4	983	17	1892
	La Normandie	6283	459·3	49·2	34·1	1147	16	1882
	Ville de Tunis	1966	317·3	34·6	16·8	444	15½	1884
	Moïse	1873	310·0	33·5	16·7	443	15	1880
	St. Augustin	1854	314·0	33·8	16·5	443	15	1880
	Versailles	4336	373·7	45·3	27·0	780	..	1882
	Ville de Madrid	1874	308·7	33·5	16·7	370	15	1880
	Ville de Naples	1879	311·6	34·1	16·7	506	15	1881
	Armand Béhic	6467	486·6	50·1	36·8	821	17½	1892
Messageries Maritimes	**Australien**	6428	482·3	49·2	34·1	818	17½	1889
	Polynésien	6506	482·3	49·2	34·1	818	17½	1890
	Ville de la Ciotat	6461	485·8	49·9	36·8	819	17½	1892
	Ernest Simons	4562	442·9	47·1	36·7	727	..	1893
	Indus	6357	446·2	50·8	36·1	417	..	1897
	Brésil	5876	463·9	46·4	32·5	743	16½	1889
	Chili	6375	462·6	47·6	36·7	719	..	1894
	Cordillère	6379	462·6	47·6	36·1	721	..	1895
	La Plata	5807	462·6	45·9	32·5	520	16½	1889

NOTE.—The armament for the larger ships is 7 5·5-in. and smaller quick-firers.

GERMANY.—Armoured Ships.

Class.	NAME.	Material.	Displacement.	Length.		Beam.		Mean Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	ins.	ins.	ins.			knots.	tons.	
c. d s.	Aegir	S.	3600	236	6	50	6	17	9	2	4800 T.	Kiel	1895	233,500	9½ H.S.	8 H.S.	3	3 9·4-in., 10 3·4-in. Q.F. 6 M.	3 (1 sub.)	17·0	225 †	255
b.	Baden	I.	7441	321	6	60	0	15	8	2	6200 Dürr.	Kiel	1880 1897	444,886	16	10	3	6 10·2-in., 8 3·4-in. Q.F., 8 1·4-in., 1 l., 6 M.*	5 (2 sub.)	17·3 t	700	376
a. g. b.	Basilisk	I.	1109	154	3	36	0	10	2	2	759	Bremen	1878	58,042	8	8	2	1 12-in., 2 3·3-in., , 2 M.	2	9·0	40	76
b.	Bayern	I.	7441	321	6	60	0	19	8	2	6326 W.T.	Kiel	1878 1896	406,660	16	10	3	6 10·2-in., 8 3·4-in. Q.F., 8 1·4-in., 1 l., 6 M.*	5 (2 sub.)	15·5 t	700	376
c. d. s.	Beowulf	S.	3500	259	2	49	3	17	9	2	4800	Bremen	1890	175,000	9½	8	1	3 9·4-in., 8 3·4-in. Q.F., 6 M.	4	16·0	225	225
b.	Brandenburg	S.	10,100	354	4	65	0	24	7	2	9640	Stettin (Vulcan)	1891	606,500	15¾ comp.	11¾ comp.	2½	6 11-in., 6 4·1-in. Q.F., 8 3·4-in., 12 1·4-in., 8 M., 2 l.	6	16·5	750	552
a. g. b.	Biene	I.	1109	154	3	36	0	10	2	2	759	Bremen	1876	62,853								
a. g. b.	Camäleon	I.	1109	154	3	36	0	10	2	2	759	Bremen	1878	57,564	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
,,	Crocodil	I.	1109	154	3	36	0	10	2	2	759	Bremen	1879	57,237								
b.	Deutschland	I.	7319	280	0	62	4	24	7	1	5360	Poplar	1874	412,022	10	8	2	8 10·2-in., 7 5·9-in., 9 3·4-in. Q.F., 12 M., 2 l.	5	14·5	710	668
t.	Friedrich der Grosse	I.	6770	307	0	53	6	24	7	1	5400	Kiel	1874	365,170	9¼	8 br. 10 tur.	..	4 10·2-in., 2 6·6-in., 10 3·4-in. Q.F., 8 M., 2 l.	4	14·0	550	537

a. c.	Fürst Bismarck	S. shd.	10,650	393	8 66	9 26	0	3	14,000 Dürr.	Kiel	1897	..	7¾ H. S.	7¾ H. S.	3	4 9·4-in. Q.F., 12 5·9-in. Q.F., 10 3·4-in., 10 1·4-in., 8 M.	6 (5 sub.)	19.0	1000†	565
	A								14,000	Kiel	Bldg.									
c. d. s.	Frithjof	S.	3500	240	0 49	3 17	9	2	4800	Bremen	1891	175,000								
c. d. s.	Hagen	S.	3500	240	0 49	3 17	9	2	4516	Kiel	1893	..	9½ H. S.	7¾ H. S.	3	3 9·4-in., 8 3·4-in. Q.F., 6 M.	4	16·0	225	225
c. d. s.	Heimdall	S.	3500	240	0 49	3 17	9	2	4393	Wilhelmshaven	1892	233,500								
c. d. s.	Hildebrand	S.	3500	240	0 49	3 17	9	2	4413	Kiel	1892	218,000								
a. g. b.	Hummel	I.	1109	143	0 36	0 10	2	2	759	Bremen	1881	56,741	8	8	2	1 12-in., 2 3 3-in., 2 M.	2	10·0	40	76
b.	Kaiser	I.	7531	292	0 62	4 24	7	1	5700	Poplar	1874	411,301	10	10	2	8 10·2-in., 1 5·9-in., 6 4-in., 9 3·4-in. Q.F., 2 M., 2 1.	5	14·6	710	668
t	Kaiser Friedrich III. §									Wilhelmshaven	1896									
t	Kaiser Wilhelm II.	—								Wilhelmshaven	1897									
t	König Wilhelm (Ersatz)	S.	11,180	377	4 67	0 25	8	3	13,000 W.T.	Kiel (Germania)	Bldg.	706,000	11¾ H. S.	9¾–6 H. S.	3	4 9·4-in. Q.F., 18 5·9-in. Q.F., 12 3·3-in., 12 1·4-in., 8 M.	6 (5 sub.)	18·0	700	655
t	A	—								Hamburg (Blohm & Voss)	Bldg.									
t	B	—								Danzig (Schichau)										
t	C. D. E.	✕									Bldg. Pro. ‡									
b	König Wilhelm	I.	9757	355	0 60	0 26	7	1	8350	Blackwall	1868 1896	505,141	12	6	2½	20 5·9-in. Q.F., 18 3 4-in., 8 M., 4 1.	5	14·7	700	759
b.	Kurfürst Friedrich Wilhelm.	S.	10,100	354	4 65	0 24	7	2	9959	Wilhelmshaven	1891	653,000	15¾ comp.	11¾ comp.	2½	6 11-in., 6 4·1-in. Q.F., 8 3·4-in., 12 1·4-in., 8 M., 2 1.	6	16·0	750	552
a. g. b.	Mücke	I.	1109	154	3 36	0 10	2	2	759	Bremen	1877	60,960	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
a. g. b.	Natter	I.	1109	154	3 36	0 10	2	2	759	Bremen	1880	52,822	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
c. d. s. b.	Odin	S.	3600	236	6 50	6 17	9	2	4800	Danzig	1894	..	9½ H. S.	7¾ H. S.	3	3 9·4 in., 10 3·4-in. Q.F., 6 M.	3 (1 sub.)	16·0	225†	266

* New armament. Also liquid fuel. ‡ Estimates 1899. § Kaiser Friedrich III, 8 cylindrical and 4 Thornycroft boilers.

GERMANY.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.	in.			knots.	tons.	
b.	Oldenburg	S.	5200	246 0	59 0	19 6	2	3900	Stettin	1884	235,342	13 comp.	8 comp.	1	8 9·4-in. (Krupp), 2 3·4-in. Q.F., 6 M.	4	13·5	475	356
t.	Preussen	I.	6770	308 6	53 6	24 7	1	4383	Stettin	1873	351,904	9	8 10	..	4 10·2-in.(Krupp), 2 6·6-in., 10 3·4-in. Q.F., 6 M., 2 1.	4	14·0	550	537
b.	Sachsen	I.	7441	321 6	60 0	19 8	2	4917 W. T.	Stettin	1877 1896	422,178	15¾	10	3	6 10·2-in. (Krupp), 8 3·4-in. Q.F., 8 1·4-in., 1 1., 6 M.*	5 (2 sub.)	14·0	700	376
c. d. s.	Siegfried	S.	3500	240 0	49 3	17 9	2	4800	Kiel (Germania)	1889	175,000	9½	7¾	3	3 9·4-in., 6 3·4-in. Q.F., 6 M.	4	16·0	225†	225
a. g. b.	Salamander	I.	1109	154 3	36 0	10 2	2	759	Bremen	1880	56,914								
,,	Skorpion	I.	1109	154 3	36 0	10 2	2	759	Bremen	1877	60,796	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
,,	Viper	I.	1109	154 3	36 0	10 2	2	759	Bremen	1876	61,463								
,,	Wespe	I.	1109	154 3	36 0	10 2	2	759	Bremen	1876	53,771								
b.	Weissenburg	S.	10,100	354 4	65 0	24 7	2	9000	Stettin (Vulcan)	1891	659,475								
b.	Wörth	S.	10,100	354 4	65 0	24 7	2	10,224 (*t*)	Kiel	1892	595,250	15¾	11¾	2½	6 11-in., 6 4·1-in. Q.F., 8 3·4-in., 12 1·4-in., 8 M., 2 1.	6	16·0‡	750†	552
b.	Württemberg	I.	7441	321 6	60 0	19 8	2	4917 T.	Stettin	1878 1897	402,512	15¾	10	3	6 10·2-in. (Krupp), 8 3·4-in. Q.F., 8 1·4-in., 1 1., 6 M.*	5 (2 sub.)	14·0	700	376

* New armament. † Also liquid fuel. ‡ Wörth: trial, 17·2 knots.

The Arminius, Friedrich Carl, and Kronprinz are now used for harbour service.

GERMANY —Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots	tons.	
3rd cl. *cr.*	"A."	S.	2600	328 0	38 7	15 1	2	6000 W.T.	Kiel (Germania)	Bldg.	167,500	..	2	10 4·1-in. Q.F., 14 1·4-in., 4 M., 2 l.	2 (sub.)	20	550	210
" "	**Alexandrine**	I. S. & W.	2373	236 3	42 7	18 4	1	2400	Kiel	1885	102,877	..	..	10 5·9-in., 4 4·1-in., 10 M., 1 l.	1	14·0	..	267
" "	**Arcona**	I. S. & W.	2373	236 3	42 7	18 4	1	2400	Danzig	1885	109,875	..	..	10 5·9-in., 4 4·1-in., 10 M., 1 l.	1	14·0	..	267
" "	"B."	S.	2800	328 0	38 7	16 5	2	6000 W.T.	Bremen (Weser)	Bldg.	167,500	..	2	10 4·1-in. Q.F., 14 1·4-in., 4 M., 2 l.	3 (1sub.)	20·0	..	210
" "	**Blitz**	S.	1382	246 0	32 10	13 5	2	2839	Kiel	1882	66,935	..	..	6 3·4-in., 4 M.	1	16·0	250	127
cr.	**Blücher**	I. & W.	2856	244 4	44 10	19 8	1	2990	Kiel	1877	136,408	..	..	2 5·9-in., 6 M.	7	14·0	400	206
g. b.	**Bremse**	S.	866	203 5	27 10	10 6	1	1500	Bremen	1884	49,308	..	2½	1 8·2-in.	..	15·0	65	73
g. b.	**Brummer**	S.	866	203 5	27 10	10 6	1	1500	Bremen	1884	52,422	..	2½	1 8·2-in.	..	15·0	65	73
3rd cl *cr.*	**Bussard**	S.	1857	256 0	30 2	18 4	2	2900	Danzig	1890	..	..	3	8 4·1-in. Q.F., 7 M.	2	16·5	400	..
" "	**Carola***	I. & W.	2169	226 4	42 7	18 4	1	2100	Stettin	1880	109,617	..	..	6 5·9-in., 2 4·1-in. Q.F., 8 3·4-in.	..	14·0	250	267
" "	**Falke**	S. & W.	1731	246 0	33 6	15 0	2	2900	Kiel	1891	..	..	3	8 4·1-in. Q.F., 7 M.	2	15·5	400	..
2nd cl. *cr.*	**Freya**	S.	5650	344 5	57 0	21 8	3	10,000 Nic.	Danzig	1897	..	4 N.S.	4 N.S.	2 8·2-in. Q.F., 8 6-in. Q.F., 10 3·4-in., 10 1·4-in., 4 M.	3 (sub.)	20	500†	440
3rd. cl. *cr.*	**Gazelle**	S. & bronze shd.	2650	328 0	38 7	15 9	2	6000 Nic.	Kiel (Germania)	1898	130,000	..	2	10 4·1-in. Q.F., 14 1·4-in., 4 M., 2 l.	3 (1sub.)	19·5	..	210
2nd "	**Gefion**	S.	4207	344 6	48 8	..	2	9000	Danzig (Schichau)	1893	..	..	3	8 5·9-in., 10 4·1-in. Q.F., 6 1·9-in., 1 l., 2 M.	2	20·0	950	312
3rd "	**Geier**	S. & W. shd.	1776	249 4	34 10	15 6	2	2960	Wilhelmshaven	1894	..	..	3	8 4·1-in. Q.F., 7 M.	2	16·2	400	..
" "	**Greif**	S.	2000	318 0	32 0	13 0	2	5400	Kiel	1886	..	..	..	2 3·4-in. Q.F., 4 M.	..	23·0	..	130

* Gunnery ship for quick-firing guns.

GERMANY.—Cruising Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots	tons.	
g. v.	**Habicht**	I. & W.	848	174	0	29	6	11	5	1	600	Elbing	1879	33,054	..	..	5 4·9-in., 5 M.	..	12·0	..	128
g. b.	**Habicht** (Ersatz)	S.	894	203	6	29	10	10	8	2	1300	Danzig	Bldg.	..	..	..	8 3·4-in. Q.F., 6 1·4-in., 2 M.	..	13·5	160	..
2nd cl. *cr.*	**Hansa**	S. shd.	5900	345	7	57	10	21	8	3	10,000 B	Stettin (Vulcan)	1898	..	4 N.S.	4 N.S.	2 8·2-in. Q.F., 8 6-in., 10 3·4-in., 10 1·4-in., 4 M.	3 (sub.)	19·0	500	440
d.v.	**Hela**	S.	2000	328	0	36	0	..		2	5860	Bremen	1895	..	..	1½	4 3·4-in. Q.F., 6 1·9-in., 2 M.	3	20·0	347	169
2nd cl. *cr.*	**Hertha**	S.	5650	344	6	57	0	21	8	3	10,000 B	Stettin (Vulcan)	1897	..	4	4 N.S.	2 8·2-in. Q.F., 8 6-in., 10 3·4-in., 10 1·4-in., 4 M.	3 (sub.)	20·0	500†	440
g. b.	**Hyäne**	I.	489	139	8	25	1	9	10	1	340	Wilhelmshaven	1878	24,340	..	..	1 4·9-in., 1 3·4-in., 4 M.	..	9·0	..	83
g. b.	**Iltis**	S. (~~shd.~~)	895	203	6	29	10	10	8	2	1300	Danzig (Schichau)	1898	100,000	..	..	8 3·4-in. Q.F., 6 1·4-in., 2 M.	..	13·5	160	..
2nd cl. *cr.*	**Irene**	S.	4400	339	6	46	0	21	0	2	8000	Stettin	1887	220,000	..	3	4 5·9-in., 8 4·1-in. Q.F., 6 1 9-in., 1 l., 8 M.	4	19·8	900	358
to. g. b.	**Jagd**	S.	1250	275	6	31	6	13	9	2	4000	Bremen	1888	..	..	2	4 3·4-in. Q.F., 2 M.	3	20·0	..	126
g. b.	**Jaguar**	S. (~~shd.~~)	895	203	6	29	10	10	8	2	1300	Danzig (Schichau)	1898	100,000	..	..	8 3·4-in. Q.F., 6 1·4-in., 2 M.	..	13·5	160	..
1st cl. *cr.*	**Kaiserin Augusta**	S. (shd.)	6331	393	0	49	3	23	0	3	14,000	Kiel (Germania)	1892	..	..	3½	12 5·9-in., 8 3·4-in. Q.F., 2 l., 8 M.	5	22·5	..	427
to. g. b.	**Komet**	S.	946	262	6	31	2	13	9	2	5000	Stettin	1892	..	..	2	4 3·4-in. Q.F., 2 M.	1	21·0 (t)	..	90
3rd cl. *cr.*	**Kondor**	S. & W.	1640	246	0	33	6	15	0	2	2930	Hamburg	1892	..	..	3	8 4·1-in. Q.F., 7 M.	2	16·5	400	..
3rd cl. *cr.*	**Kormoran**	S. & W.	1640	246	0	33	6	15	0	2	2930	Danzig	1892	..	..	3	8 4·1-in. Q.F., 7 M.	2	16·0	400	..
cr.	**Marie**	I. & W.	2100	226	4	42	7	18	4	1	2100	Hamburg	1881	..	..	..	8 5·9-in., 2 3·4-in. Q.F., 1 l., 6 M.	..	13·5	..	267
d. v.	**Meteor**	S.	946	262	6	29	6	11	6	2	4500	Gaarden	1890	..	..	2	2 3·4-in. Q.F., 2 M.	3	21·0	..	90
cr.	**Nixe** §	I. & W.	1760	177	2	42	8	18	0	1	700	Danzig	1885	..	..	..	8 5·9-in.	..	10·5	..	116

[illegible]	Olga	I. & W.	2100	226	4 42	7 18	4 1	2100	Stettin	1880	113,812	..	..	8 5·9-in., 2 3·4-in. Q.F., 1 L., 6 M.	..	14·0	..	267
3rd cl. *cr.*	**Pfeil**	S.	1382	246	0 32	10 13	5 2	2700	Wilhelmshaven	1882	73,605	..	..	4 3·4-in. Q.F., 4 M.	1	16·0	250	127
2nd cl. *cr.*	**Prinzess Wilhelm**	S.	4400	339	6 46	0 21	0 2	8000	Gaarden	1887	220,000	..	3	4 5·9-in., 8 4·1-in. Q.F., 6 1·9-in., 1 L., 8 M.	4	18·7	900	358
cr.	**Schwalbe**	S. & W.	1120	203	0 30	6 12	4 2	1500	Wilhelmshaven	1887	..	..	3	8 4·1-in. Krupp, 7 M.	..	13·5	300	150
3rd cl. *cr.*	**Seeadler**	S. & W.	1640	246	0 33	6 15	0 2	2800	Hamburg	1892	..	..	3	8 4·1-in., 7 M.	2	16·0	400	156
„ „	**Sophie**	I. & W.	2100	226	4 42	7 18	4 1	2100	Danzig	1892	117,155	..	..	8 5·9-in., 2 3·4-in. Q.F., 1 L., 6 M.	..	14·0	..	267
4th cl. *cr.*	**Sperber**	S. & W.	1120	236	0 29	8 12	6 2	1500	Wilhelmshaven	1888	..	..	3	8 4·1-in., 6 M.	..	13·5	300	150
2nd cl. *cr.*	**Victoria Luise**	S.	5650	344	5 57	0 21	8 3	10,000 Dürr.	Bremen	1897	..	4 H.S.	4 H.S.	2 8·2-in. Q.F., 8 6-in. Q.F., 10 3·4-in., 10 1·4-in., 4 M.	3 sub.	20·0	500	440
2nd cl. *cr.*	**Vineta**	S. shd.	5900	315	7 57	10 21	8 3	10,000 W.T.	Danzig									
3rd cl. *cr.*	**Wacht**	S.	1250	275	6 31	6 13	9 2	4000	Bremen	1887	..	..	2	4 3·4-in. Q.F., 2 M.	3	19·6	..	126
g. b.	**Wolf**	I.	480	139	8 25	1 9	10 1	340	Wilhelmshaven	1878	24,343	..	..	1 4·9-in., 1 3·4-in., 4 M.	..	9 0	..	83
g. b.	**Wolf** (Ersatz)	S.	804	203	6 29	10 10	8 2	1300	Danzig	Bldg.	..	..	..	8 3·4-in. Q.F., 6 1·4-in., 2 M.	..	13·5	160	..
d. v.	**Zieten**	I.	975	196	10 29	6 11	6 1	2323	Blackwall	1876	81,755	..	..	4 1·9-in. Q.F., 6 M.	..	16·0	140	111
g. b.	**Zieten** (Ersatz)	S.	894	203	6 29	10 10	8 2	1300	Danzig	Bldg	..	..	..	8 3·4-in. Q.F., 6 1·4-in., 2 M.	..	13·5	160	..

The Charlotte, Mars, Grille, Hay, Ulan, Gneisenau, Moltke, Stein and Stosch, in addition to others given in the list, are used as schoolships.
The Imperial Yacht Hohenzollern, 4187 tons, 9460 I.H.P., 22 knots, carries 8 1·9-in. Q.F., but provision is made for mounting 3 4·1-in., 12 1·9-in Q.F. and 4 M.
A station vessel for Constantinople has been bought and named Loreley, the older ship having been removed from the list.

† Displacement with 950 tons of coal, 6100 tons. Provision made for liquid fuel.

§ Training Ship.

Merchant Cruisers (Auxiliaries to the German Navy).

To what Company belonging.	Name of Ship.	Displacement.	Length.		Beam.		Draught of Water.		Indicated H.P.	Ocean Speed.	When Built.	Armament of each Ship.
		tons.	ft.	in.	ft.	in.	ft.	in.		knots.		
Hamburg-American S.S. Co.	Fürst Bismarck . .	10,500	502	0	57	6	22	3	16,400	19½	1891	8 5·9-in., 4 4·7-in., 2 3·4-in. Q.F., 2 2·2-in., 14 M.
	Augusta Victoria . .	9,500	459	3	56	0	23	0	12,280	18	1889	
North German Lloyd	Spree	8,900	462	6	51	10	22	0	12,770	19	1890	
	Lahn	7,700	449	6	49	0	22	0	9,500	18½	1887	
	Kaiser Wilhelm der Grosse	20,000	625	0	66	0	27	0	27,000	22	1897	Not known.
	Kaiser Friedrich III. .	17,000	580	9	63	11	..		25,000	22	1897	
	Aller	4,965	436	6	48	0	..		1,300(a)	16	1885	
	Saale	4,965	436	6	48	0	..		1,300(a)	16	1886	
	Trave	4,965	436	6	48	0	..		1,300(a)	16	1886	

(a) Nominal horse-power.

GREECE.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Battery.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.	ins.			knots.	tons.	
c.d.s.	**Basileos Georgios**	I.	1774	200 2	36 0	15 6	2	2100	Blackwall	1867	..	7	6	9	2 6·6-in. (Krupp), 1 5·9-in. 9 M.	1	12 0	210	120
br.	**Basilissa Olga*** .	W.	2030	230 0	59 0	18 0	1	1950	San Rocco	1869	..	6	4½	..	4 6·6-in. 5½-ton (Krupp), 2 6·6-in. 3½-ton, 4 M., 4 l. .	3	10·0	240	400
b.	**Hydra** . .	S.	4885	334 6	51 10	23 3	2	7000	St. Nazaire	1889	..	11¾	13½	2½	3 10·6-in., 5 5·9-in., 7 2·2-in., 16 M.	3	17·0	600	400
b.	**Psara** . . .	S.	4885	334 6	51 10	23 3	2	7000	Havre . .	1890	..	11¾	13½	2½	3 10·6-in. Canet, 5 5·9-in., 1 3·9-in., 8 2·5-in., 4 1·8-in., 12 1·4-in.	3	17·0	600	400
b.	**Spetsai** . .	S.	4885	334 6	51 10	23 3	2	7000	Havre . .	1889	..	11¾	13½	2½	3 10·6-in., 5 5·9-in., 7 2·2-in., 16 M.	3	17 0	600	400

* Has received two fighting masts and new machinery; similar changes in the Georgios.

The Hydra and Spetsai are intended to receive 1 3·9-in. Q.F. and 8 2·5-in. Q.F. guns (Canet), in addition to the present armament, but the transformation has been deferred.

GREECE.—Cruising Ships.

Class.	NAME.	Mat'rial of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			Metric tons.	ft. in.	ft. in.	ft. in.	no.									knots.	tons.	
g.v.	**Acheloos** . .	S.	420	130 0	24 6	11 6	1	400	Blackwall	1884	..	..	..	2 3·7-in. (Krupp), 3 M. .	..	10·0	50	..
g.v.	**Alphios** . . .	S.	420	130 0	24 6	11 6	1	400	Blackwall	1884	..	..	..	2 3·7-in. (Krupp), 3 M. .	..	10·0	50	..
g.v.	**Aphroessa** . .	I.	380	124 7	22 11	9 10	1	160	Pt. Glasgow	1858	..	..	..	1 3·4-in. (Krupp) .	..	9·0	30	..
g.v.	**Eurotas** . . .	S.	420	130 0	24 6	11 6	1	400	Dumbarton	1884	..	..	..	2 3·7-in. (Krupp), 3 M. .	..	10·0	50	..
corv.	**Hellas** (training) .	W.	1654	200 2	37 0	19 4	1	1500	Northfleet	1858 rep. 1878-90	..	..	..	6 5·9-in. (Krupp), 2 M. .	..	11·0	230	..
cr.	**Mykale** (transport) .	S.	1000	210 6	32 6	18 0	2	2400	Glasgow	1880	..	..	..	2 M.	..	1·4	..	..
corv.	**Nauarchos Miaulis**	I. & W.	1800	246 0	36 0	14 5	1	2200	La Seyne	1879	..	..	..	3 6·6-in., 5½-ton (Krupp), 1 6·6-in. 3½-ton do., 2 M., 4 l.	..	15·0	220	250
g.v.	**Paralos** . . .	I.	380	123 0	23 11	9 10	1	204	Pt. Glasgow	1858	..	..	..	1 3·4-in. (Krupp), 1 M. .	..	8·0	60	..
g.v.	**Pinios** . . .	S.	420	130 0	24 6	12 6	1	400	Dumbarton	1884	..	..	..	2 3·7-in. (Krupp), 3 M. .	..	10·55	50	..
g.v.	**Plixaura** . .	I.	380	124 7	22 11	9 10	1	160	Pt. Glasgow	1856	..	..	..	1 3·4-in. (Krupp) . .	..	9·0	55	..
g.v.	**Salaminia** . .	I.	380	123 0	23 11	9 10	1	200	Pt. Glasgow	1858	..	..	..	1 3·4-in. (Krupp), 1 M. .	..	8·0	60	..
corv.	**Sfaktirea** . .	S.	1000	216 6	29 3	18 0	1	2400	England	1885	..	..	..	2 3·9-in. (Krupp), 2 M. .	..	14·5	100	..
g.v.	**Syros** . . .	I.	380	124 7	22 11	9 10	1	160	Pt. Glasgow	1858	..	..	..	1 3·4-in. (Krupp) . .	..	9·0	18	100

Torpedo depôt-ship.—Kanaris, 1100 tons, 500 I.H.P., 2 3·9-in. (Krupp) guns, 2 Whitehead torpedo-launching guns on broadside, 2 under-water torpedo tubes ahead; 14 knots speed.

There are also 2 gunboats, Ambrakia and Aktion, of 440 tons displacement, 380 horse-power, 10 knots speed, fitted with 1 10·2-in. Krupp gun and 2 machine guns; launched 1885; 4 gunboats, Α. β. Γ. Δ. (52 tons, 1 4·7-in. Krupp), launched 1881; and 3 mining vessels (300 tons), launched 1881.

ITALY.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			Metric tons.	ft.	in.	ft.	in.	f.	in.	no.				£	Inches.	Inches.	ins.			knots.	tons.	
t.	**Affondatore**	I.	4062	290	0	40	0	20	0	1	3240	Millwall	1865	197,600	5	5	2	2 28-ton (Armstrong), 6 4·7-in. Q.F., 2 2·9-in., 4 2·2-in., 4 1·4-in., 2 M.	2	12·0	460	303
"	**Ammiraglio di St. Bon**	S.	9800	344	6	69	4	24	9	2	13,500	Venice	1897	..	9¾–4 H.S.	9¾ H.S.	3–1½	4 10-in., 8 6-in. Q.F., 8 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	5	18·0	1000	..
a.c.	**Ancona**	I.	4460	256	0	50	0	25	0	1	2548	Bordeaux	1864	172,000	4½	4½	..	6 6-in. Q.F., 6 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	3	12·0	485	423
b.	**Andrea Doria**	S.	11,000	328	2	65	4	27	2	2	10,500	Spezia	1885	765,500	18 comp.	18 comp.	3	4 105-ton (Armstrong), 2 6-in. 4 4·7-in. Q.F., 2 2·9-in., 10 2·2-in., 17 1·4-in., 2 M.	5 (2 sub.)	16·1	850	509
b.	**Benedetto Brin**	S.	13,765	413	4	78	2	27	0	2	18,000 W.T.	Castellamare	Bldg.	..	6 H.S.	9¾ H.S.	3	4 12-in., 4 8-in. Q.F., 12 6-in., 10 3-in., 6 1·8-in., 2 M.	4 (sub.)	21·0	1000	600
a.c.	**Carlo Alberto**	S.	6500	325	0	59	0	22	11	2	13,000	Spezia	1896	..	6 H.S.	6 H.S.	1½	12 6-in. Q.F., 6 4·7-in., 2 2·9-in., 10 2·2-in., 10 1·4-in., 2 M.	5	20·0	1000	460
a.c.	**Castelfidardo**	I.	4250	256	0	50	0	21	11	1	2125	St. Nazaire	1863	233,000	4½	4½	13¾	6 6-in. Q.F., 6 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	3	12·0	485	423
t.	**Dandolo** *	I & S	11,202	340	11	64	9	26	7	2	8045	Spezia	1878 1898	872,640	21½	18	2	4 10-in. (Armstrong), 7 6-in. Q.F., 5 4·7-in., 2 2·9-in., 10 2·2-in., 14 1·4-in., 2 M.	4	15·6	1000	487
t.	**Duilio**	I & S	11,138	340	11	64	9	26	7	2	7710	Castellamare	1876	850,400	21½	18	2	4 100-ton M.L.R. (Armstrong), 3 4·7-in. Q.F., 2 2·9-in., 8 2·2-in., 22 1·4-in., 2 M.	4	15·0	1000	487
t.	**Emanuele Filiberto**	S.	9800	344	6	69	4	24	9	2	13,500	Castellamare	1897	..	9¾–4	9¾	3–1	4 10-in., 8 6-in. Q.F., 8 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	5	18·0	1000	..
b.	**Francesco Morosini**	S.	11,000	328	2	65	4	27	2	2	10,000	Venice	1885	770,680	18 comp.	18 comp.	3	4 105-ton (Armstrong), 2 6-in., 4 4·7-in. Q.F., 2 2·9-in., 10 2·2-in., 17 1·4-in., 2 M.	5 (2 sub.)	17·0	850	509
a.c.	**Francesco Ferrucio**										13,500 Nic.	Spezia	Bldg.									
a.c.	**Giuseppe Garibaldi**	S.	7398	344	0	61	3	23	4	2	13,500 Nic.	Sestri-Ponente (Ansaldo)	Bldg.	..	6 N.S.	6 N.S.	1½	1 10-in., 2 8-in. Q.F., 14 6-in., 10 2·9-in., 6 1·8-in., 2 M.	4 (sub.)	20·0	655	540
a.c.	Unnamed †										13,500 W.T.	Taranto	Pro.									

* New armament given. The reconstruction of the Duilio is not likely to be proceeded with.

† Estimates of 1899.

ITALY.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.					inches.	inches.	inches.			knots.	tons.	
b.	**Italia.** . . .	S.	14,387	400	6	74	0	31	2	2	11,986 (*t*)	Castellamare .	1880	1,167,680	16 funnel op'nings	19 *comp.*	3	4 100-ton (Armstrong), 8 6-in., 4 4·7-in. Q.F., 12 2·2-in., 24 1·4-in., 2 M.	4	18·0	1650	748
b.	**Lepanto** . . .	S.	14,400	400	6	74	0	31	2	2	15,800 (*t*)	Leghorn (Orlando)	1883	1,150,880	16 funnel op'nings	19 *comp.*	3	4 100-ton (Armstrong), 8 6-in., 4 4·7-in. Q.F., 12 2.2-in., 34 1·4-in., 2 M.	4	18·38	1650	748
a.c.	**Marco Polo** . . .	S.	4583	327	0	48	3	19	6	2	10,000	Castellamare .	1890	344,400	4	4	1	6 5·9-in. Q.F., 10 4·7-in., 2 2·9-in., 9 2·2-in., 4 1·4-in., 2 M.	5 (1 sub.)	19·0	..	315
a.c.	**Maria Pia** . .	I.	4268	256	0	49	4	22	7	1	2924	La Seyne .	1863	215,000	4½	4½	..	8 5·9-in., 6 4·7-in. Q.F., 2 2·9-in. 10 2·2-in. 10 1·4-in., 2 M.	2	12·0	485	423
b.	**Regina Margherita**	S.	12,765	413	4	78	2	27	0	2	18,000 W.T.	Venice .	Bldg.	..	6 H.S.	9¾ H.S.	3	4 12-in., 4 8-in. Q.F., 12 6-in., 10 3-in., 6 1·8-in., 2 M.	4 (sub.)	21·0	1000	600
b.	**Re Umberto** . .	S.	13,825	400	0	76	9	28	6	2	19,500	Castellamare .	1888	1,058,500	4	18	3	4 67-ton (Armstrong), 8 6-in. Q.F., 16 4·7-in., 2 9-in., 15 2·2-in., 14 1·4-in., 2 M.	8	19·0	1200	785
b.	**Ruggiero di Lauria** .	S.	11,000	328	2	65	4	27	2	2	10,600	Castellamare .	1884	777,560	18 *comp.*	18 *comp.*	3	4 105-ton (Armstrong), 2 6-in. 4 4 7-in. Q.F., 2 2·9-in., 10 2·2-in., 17 1·4-in., 2 M.	5 (2 sub.)	17·0	850	509
a.c.	**San Martino** (training service)	I.	4268	256	0	49	4	22	7	1	2620	La Seyne .	1863	213,880	4½	4½	..	8 5·9-in., 6 4·7-in. Q.F., 2 2·9-in., 10 2·2-in., 10 1·4-in., 2 M.	2	12·0	490	423
b.	**Sardegna** . .	S.	13,860	411	0	76	9	28	6	2	20,800	Spezia . .	1890	1,057,440	4	14½ *comp.*	3	4 67-ton (Armstrong), 8 5·9-in. Q.F., 16 4·7-in., 2 2·9-in., 20 2·2-in., 10 1·4-in., 2 M.	5	20·0	1200	785
„	**Sicilia** . . .	S.	13,375	400	0	76	9	28	6	2	19,500	Venice . .	1891	1,050,000	4	18 *comp.*	3	4 67-ton (Armstrong), 8 5·9-in. Q.F., 16 4·7-in., 2 2·9-in., 20 2·2-in., 10 1·4-in., 2 M.	5	19·2	1200	785
a.c.	**Varese** . . .	S.	7400	344	6	59	0	23	9	2	13,500 B	Leghorn (Orlando)	Bldg.	..	6 H.S.	6 H.S.	1½	1 10-in., 2 8-in. Q.F., 14 6-in., 10 2·9-in., 6 1·8-in., 2 M.	4	20·0	650 1200	500
a.c.	**Vettor Pisani** . .	S.	6500	325	0	59	0	22	11	2	13,000	Castellamare .	1895	..	6 H.S.	6 H.S.	1½	12 6-in. Q.F., 6 4·7-in., 2 2·9-in., 10 2·2-in., 10 1·4-in., 2 M.	5	20·0	600	..

Note.—The Palestro, Principe Amodeo, and Roma are non-effective, or only available for coast defence.

ITALY.—Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armaments. Guns.	Armaments. Torpedo Tubes.	Speed	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots.	tons.	
to.cr	**Agordat**	S.	1850	289	0	30	6	11	1	2	8000 B	Castellamare	Bldg.	..	..	1	12 3-in. Q.F.	2	23·0	500	150
3rd cl. *cr.*	**Amerigo Vespucci** (training)	S.	2795	255	11	42	7	17	0	1	3340	Venice	1882	176,300	..	¾	6 5·9-in., 4 2·2-in., 8 1·4-in., 2 1., 4 M.	2	14·0	500	265
g.v.	**Andrea Provana**	S.	649	167	4	26	3	10	2	1	1080	Leghorn (Orlando)	1884	39,760	..	..	4 4·7 in., 3 1·4-in., Q.F.	..	13·0	120	103
d.v.	**Archimede**	S.	784	230	0	26	3	10	0	1	1700	Venice	1887	60,120	..	..	4 4·7-in., 2 2·2-in. Q.F., 2 1·4-in.	2	16·0	210	109
to.g.b.	**Aretusa**	S.	846	230	0	26	10	11	9	2	4420	Leghorn (Orlando)	1891	72,920	..	1	1 4·7-in., 6 2·2-in., and 3 1·4-in.	6	20·7	180	111
3rd cl. *cr.*	**Calabria**	S.	2442	249	4	42	0	16	7	2	4094 *t.*	Spezia	1894	183,120	..	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	2	16·4 *t.*	500	257
to.g.b.	**Calatafimi**	S.	840	229	6	27	0	10	2	2	4000	Castellamare	1893	72,920	..	1	1 4.7-in. Q.F., 6 2·2-in., 3 1·4-in.	6	20·0	120	111
„	**Caprera**	S.	853	230	0	27	4	10	2	2	4800	Leghorn (Orlando)	1894	72,920	..	1	2 4·7-in. Q.F., 4 2·2-in., 2 1·4-in. Q.F.	5	21·0	180	111
g.v.	**Cariddi**	W.	1050	177	2	28	6	12	5	1	956	Castellamare	1875	65,480	..	..	2 4·7-in., 4 2·2-in. Q.F.	..	10·0	164	..
to.cr.	**Coatit**	S.	1850	289	0	30	6	11	1	2	8000 B	Castellamare	Bldg.	..	..	1	12 3-in. Q.F.	2	23·0	500	150
to.g.b.	**Confienza**	S.	768	230	0	25	6	9	0	2	1887	Spezia	1887	61,480	..	1	1 4·7-in. Q.F., 6 2·2-in., 2 1·4-in.	4	17·0	180	111

ITALY.—Cruising Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
															Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots.	tons.	
3rd cl. *cr.*	**Cristoforo Colombo**	S.	2675	249	0	36	0	17	6	..	3800	Venice	1892 Reblt	157,240	..	..	6 4·7-in., 4 2·2-in., Q.F., 4 1·4-in.	..	16·0	500	203
g.v.	**Curtatone**	S.	1040	177	3	32	8	13	6	1	1100	Venice	1887	58,440	..	..	6 4·7-in. Q.F., 4 2·2-in., 2 1·4-in., 2 M.	..	12·0	197	131
3rd cl. *cr.*	**Dogali**	S.	2088	250	0	37	0	14	6	2	7600	Elswick	1887	156,040	4½	2	6 6-in. (Armstrong), 1 2·9-in., 9 2·2-in. Q.F., 2 1·4-in., 2 M.	4	19·66	480	257
,,	**Elba**	S.	2730	272	6	40	8	16	7	2	7471 (*t*)	Castellamare	1893	200,000	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	4	17·9*t*	..	257
2nd cl. *cr.*	**Etna**	S.	3530	282	2	42	7	19	0	2	7480	Castellamare	1885	226,720	5	1½	2 9·8-in. (Armstrong), 6 5·9-in., 1 2·9-in., 5 2·2-in. Q.F., 8 1·4-in., 2 M.	4	17·8	630	315
to.g.b.	**Euridice**	S.	840	229	6	27	0	10	2	2	4000	Castellamare	1891	72,920	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	5	19·8*t*	120	111
3rd cl. *cr.*	**Etruria**	S.	2280	262	6	39	6	16	7	2	7585 (*t*)	Leghorn (Orlando)	1891	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 10 1·4-in., 2 M.	2	19·8*t*	400	257
2nd cl. *cr.*	**Fieramosca**	S.	3600	290	0	43	6	19	4	2	7700	Leghorn (Orlando)	1888	240,120	5	1½	2 9·8-in., 6 6-in. Q.F., 1 2·9-in., 5 2·2-in., 8 1·4-in., 2 M.	4	17·5	590	315
cr.	**Flavio Gioja** (training)	S.	2533	255	11	42	7	17	0	1	4150	Castellamare	1881	193,920	..	1½	6 5·9-in., 4 2·2-in. Q.F., 8 1·4-in., 2 l., 4 M.	2	15·0	500	265
to.g.b.	**Folgore**	S.	370	187	0	19	8	6	7	2	2040	Castellamare	1886	39,840	..	..	2 6-pr. and 4 3-pr. Q.F.	4	20·0	60	45
d.v.	**Galileo**	S.	770	230	0	26	3	8	2	1	1700	Venice	1887	56,720	..	..	4 4·7-in., 2 2·2-in. Q.F., 2 1·4-in.	2	15·0	210	109

3rd cl. cr.	Giovanni Bausan	S.	3068	275	7 42	7 18	4	2	6500	Elswick	1883	179,120	5	1½	2 9·8-in. (Armstrong), 6 5·9-in., 1 2·9-in., 4 2·2-in. Q.F., (Imb.) 8 1·4-in., 2 M.	3	17·5	600	267
to.g.b.	Goito	S.	812	230	0 25	6 11	9	2	2620	Castellamare	1887	70,680	..	1	4 2·2-in. Q.F., 5 1·4-in.	5	19·0	180	111
g.v.	Governolo	S.	1255	185	0 33	9 13	9	1	1100	Venice	1894	58,440	..	..	4 4·7-in. Q.F., 4 2·2-in., 2 1·4-in., 2 M.	..	13·0	200	131
to.g.b.	Iride	S.	840	229	6 27	0 10	2	2	4000	Castellamare	1891	72,920	..	1	1 4·7-in. Q.F., 6 2·2-in, 3 1·4-in.	6	19·6	120	111
3rd cl. cr.	Liguria	S.	2280	262	6 39	4 16	9	2	7677 (t)	Sestri (Ansaldo)	1893	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 10 1·4-in., 2 M. (2 Maxims).	2	18·0	430	257
„ „	Lombardia	S.	2380	262	6 39	6 16	7	2	6843 (t)	Castellamare	1890	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	2	17·0t	430	257
d.r.	Marcantonio Colonna	S.	656	216	6 23	11 10	10	1	1700	..	1879	51,480	..	..	5 2·2-in. Q.F., 2 M.	..	15·4	197	100
to.g.b.	Minerva	S.	846	246	0 27	6 11	9	2	4800	Sestri (Ansaldo)	1892	72,720	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	5	19·0	120	111
„	Montebello	S.	814	230	0 25	6 11	9	3	2776	Spezia	1888	74,120	..	1	6 2·2-in. Q.F., 2 1·4-in.	4	19·0	100	111
„	Monzambano	S.	840	230	0 25	6 11	9	3	1953	Spezia	1888	70,680	..	1	6 2·2-in. Q.F., 2 1·4-in.	4	17·0	100	111
„	Partenope	S.	840	246	0 27	6 11	9	2	4200	Castellamare	1890	71,000	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	5	19 0	100	111
3rd cl. cr.	Piemonte	S.	2500	300	0 38	0 15	0		12,000	Elswick	1888	220,000	3	3	6 6·6-in. Q.F., 6 4·7-in., 10 2·2-in., 6 1·4-in., 4 M.	3	21·0	560	296
3rd cl. cr.	Puglia	S.	2550	269	0 41	0 16	9	2	7000	Taranto	1898	200,000	4½	1	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	2	20·0	650	257
d.v.	Rapido	I.	1568	262	5 30	6 12	6	1	1920	Leghorn (Orlando)	1876	77,400	..	..	5 2 2 in. Q.F., 2 M.	..	13·4	300	135
to.g.b.	Saetta	S.	400	187	0 19	8 6	7	2	2400	Castellamare	1887	38,880	..	..	2 2·2-in. Q.F., 4 1·4-in.	3	20·0	90	58

ITALY.—Cruising Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots.	tons.	
cr.	**Savoia** (used as the Royal Yacht)	S.	2850	275 6	42 7	17 0	1	3340	Castellamare	1883	176,160	..	1·5	6 2·2-in. Q.F., 6 1·4-in., 4 l., 2 M.	2	14·0	600	216
g.v.	**Scilla**	W.	1076	177 2	28 6	12 5	1	826	Castellamare	1874	65,520	..	..	4 2·2-in. Q.F., 2 M.	..	10·0	140	111
g.b.	**Sebastiano Veniero**	S.	629	170 0	26 3	10 6	1	1160	Leghorn (Orlando)	1884	36,160	..	..	4 4·7-in., 3 1·4-in. Q.F.	..	13·0	150	103
d.v.	**Staffetta**	I.	1388	252 7	30 10	13 2	1	1800	S. Pierdarena (Ansaldo)	1876	82,600	..	..	4 4·7-in., 7 1·4-in. Q.F.	1	13·5	300	135
2nd cl. *cr.*	**Stromboli**	S.	3475	282 2	42 7	19 0	2	6252	Venice	1886	220,080	5	1·5	2 9·8-in. (Armstrong), 6 5·9-in., 1 2·9-in., 5 2·2-in. Q.F., 8 1·4-in., 2 M.	4	17·0	630	315
to. g.b.	**Tripoli**	S.	848	230 0	25 10	11 9	3	2543	Castellamare	1886	72,080	..	1	4 2·2-in. Q.F., 4 1·4-in.	5	18·0	130	111
3rd cl. *cr.*	**Umbria**	S.	2280	262 6	39 6	16 7	2	7104 (*t*)	Leghorn (Orlando)	1891	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 8 2·2-in., 10 1·4-in., 1 l., 2 M.	4	18·83 (*t*)	430	257
to. g.b.	**Urania**	S.	846	230 0	27 0	11 2	2	4000	Sestri (Odero)	1891	72,920	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	6	20·0	120	111
d.v.	**Vedetta**	I.	827	183 9	26 11	11 5	1	670	Genoa	1866	32,400	..	..	4 4·7-in., 6 1·4-in. Q.F.	..	11·0	137	40
2nd cl. *cr.*	**Vesuvio**	S.	3427	282 2	42 7	19 0	2	6820	Leghorn (Orlando)	1886	218,320	5	1·5	2 9·8-in., 6 5·9-in., 1 2·9-in., 5 2·2-in. Q.F., 8 1·4-in., 2 M.	4	17·0	600	315
g.v.	**Volturno**	S.	1040	177 3	32 8	14 4	1	1100	Venice	1887	58,960	..	..	4 4·7-in., 4 2·2-in. Q.F., 2 1·4-in., 2 M.	..	13·0	206	131

Subsidised auxiliary cruisers and despatch vessels.—Nord America, Vittoria, Duca de Galliera, and Duchessa di Genova (La Veloce S.S. Co.), Regina Margherita, Elettrico, Candia and Malta (Navigazione Generale). The armament of these vessels is 2 4·7-in. Q.F., and 4 1·4-in. M. A cruiser of 1100 tons displacement, 7000 I.H.P., and [illegible] is projected. The gun vessels Castore and Polluce (530 tons) have been converted into tank-ships, and their guns landed and placed in the forts at Taranto.

JAPAN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.†	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.	inches.			knots.	tons.	
t.	**Asahi**	S.	15,200	400 0	75 2	27 3	2	15,000 B	Clydebank	1899	..	9–4 H. S.	14–10 H. S.	4–2½	4 12-in., 14 6-in. Q.F., 20 12-pr., 8 3-pr., 4 2½-pr.	5 (4 sub.)	18	1400	..
a.c.	**Asama**	S.	9750	408 0	67 0	24 § 3	2	19,000 *t*	Elswick	1898	..	7 H. S.	6	2	4 8-in. Q.F., 14 6-in. (Armstrong), 12 12-pr., 7 2½-pr.	5	22·1 *t*	600 1200	..
a.c.	**Azuma**	S.	9436	445 10	59 6	28 0	2	17,000 B	Rochefort	Bldg.	..	6	..	3	4 8-in., 12 6-in. Q.F., 12 3-in., 12 1·8-in.	5 (4 sub.)	..	..	..
b.	**Chin-Yen (Ex. Chen Yuen)**	S.	7400	308 5	59 0	20 0	2	6200	Stettin	1882	..	14	12	3	4 12-in. (Krupp), 2 5·9-in., 8 l., 8 M.	3	14	1000	250
a.c.	**Chiyoda**	S.	2450	308 0	42 6	14 0	2	5700 B	Clydebank	1889	..	4½	..	1–2	10 4·7-in. Q.F., 14 3-pr., 3 M.	3	17·5	420	300
b.	**Fuji**	S.	12,320	374 0	73 0	26 6	2	14,000	Thames	1896	..	18—6 H. S.	14 H. S.	2½ H. S.	4 12-in., 10 6-in. Q.F., 20 3-pr., 4 4½-pr.	5 (4 sub.)	19·2 18·5 *t*	1100	600
b.	**Hatsuse**	S.	15,000	400 0	76 6	27 0	2	14,500	Elswick	Bldg.	..	9–4 H. N. S.	6 H. N. S	3	4 12-in., 14 6-in. Q.F., 20 12-pr., 8 3-pr., 4 2½-pr.	5	18·0	700 1400	741
a.c.	**Hi-yei** *	C.	2200	231 0	40 9	17 4	1	2490	Milford	1878	..	4½	..	..	3 6·6-in. (Krupp), 6 5·9-in., 4 M., 1 l.	..	13·0	280	308
"	**Kon-go** *	C.	2200	231 0	40 9	17 4	1	2450	Hull	1877	..	4½	..	..	3 6·6-in. (Krupp), 6 5·9-in., 4 M., 1 l.	..	13·7	280	308
c.d.s.	**Ping-Yuen-Go (Ex. Ping Yuen.)**	S.	2000	200 0	40 0	16 0	2	2400	Foo Chow	1890	..	8	5	2	1 10·2-in. (Krupp), 2 5·9-in., 6 M.	4	11·0	350	250
a.c.	**Riojo** *	C.	2459	213 0	34 0	17 4	1	975	Thames	1864	..	4½	..	..	1 6-in. (Krupp)	..	9·0	350	306
b.	**Shikishima**	S.	14,850	400 0	75 6	27 3	2	14,500 B	Thames	1898	..	9–4 H. S.	14–6	3–5	4 12-in., 14 6-in. Q.F., 20 12-pr., 8 M.	5 (4 sub.)	18·5	700	741
a.c.	**Tokiwa**	S.	9750	408 0	67 0	24 § 3	2	18,000	Elswick	1898	..	7–3½ H. S.	6	2	4 8-in. Q.F., 14 6-in. (Armstrong), 12 12-pr., 7 2½-pr.	4	20·7	600	676
a.c.	**Yakumo**	S.	9850	407 9	64 4	23 9	2	16,000 B	Stettin	Bldg.	..	7–3½	6	2½	4 8-in. (Armstrong) Q.F., 6 6-in., 12 12-pr. (Armstrong), 7 2½-pr.	5 (4 sub.)	20·0	1200 600 (1100)	500
b.	**Yashima**	S.	12,320	374 0	73 0	26 6	2	14,000	Elswick	1896	..	18 6 N. S.	14 N. S.	2½	4 12-in., 10 6-in. Q.F., 20 3-pr., 4 4½-pr.	5 (4 sub.)	19·2 18·5 *t*	1100	600
b.	Unnamed	S.	15,200	400 0	76 0	27 3	2	15,000 B	Barrow	Bldg.	..	12–4 H. N. S.	14–6 H. N. S.	3	4 12-in., 14 6-in. Q.F., 20 12-pr., 8 3-pr., 4 2½-pr.	(4 sub.)	18·0	1400	730
a.c.	Two unnamed	S.	9750	400 0	68 6	24 § 3	2	14,500	Elswick	Bldg.	..	7–3½ H. N. S.	6 H. N. S.	2½	4 8-in., 14 6-in. Q.F., 12 12-pr., 7 2½-pr.	4	20·7	600 1400	676

* These are now used as training ships; they have no armour as against end-on fire, and no armoured deck.

† All Q.F. guns and 12-in. for new ships are Armstrong.

§ Mean draught.

JAPAN.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
g.v.	**Akagi**	S.	615	164 0	27 0	10 0	1	700	Japan	1889	..	..	..	1 8·2-in., 1 5·9-in., 2 l., 2 M.	..	13·0	..	113
t.g b.	**Akasaki**	S.	875	240 0	27 6	13 0	2	5500	Japan	1895	..	..	..	2 4·7-in. Q.F., 4 3-pr.	5	21·0	200	..
cr.	**Akashi**	S.	2700	306 9	40 0	16 4	2	8500	Japan (Yokosuka)	1895	327,000	..	2–1	2 6-in. Q.F. (Armstrong), 6 4·7-in., 12 3-pr., 4 M.	2	20·0	200	..
„	**Akitsushima**		3150	302 0	42 7	18 5	2	8400	Japan	1892	..	4½	3	4 6-in. Q.F., 6 4·7-in., 10 3-pr.	4	19·0	..	330
g.v.	**Atago**	S.	615	154 0	27 0	10 6	2	700	Japan	1887	..	..	..	1 8·2-in., 1 4·7-in., 2 M.	..	12 0	60	113
„	**Banjo**	W.	656	154 0	25 0	12 0	1	590	Japan	1879	..	..	..	1 6-in., 2 4¾-in., 1 M.	..	10·0	107	115
cr.	**Chitose***	S.	4760	396 0	49 0	17 7	2	15,500	San Fr'cisco	1898	205,200	4½	4½–1¾	2 8-in. Q.F., 10 4·7-in., 12 12-pr., 2 6-pr., 2 2½-pr.	5	22·5	350 1000	405
„	**Hashidate**	S.	4277	295 0	50 10	21 2	2	5400	Japan	1891	..	12	2	1 12·5-in. (Canet), 11 4·7-in. Q.F., 5 6-pr., 11 3-pr., 6 M.	4	17·0	400	350
„	**Itsukushima**	S.	4277	295 0	50 10	21 2	2	5400	La Seyne	1891	..							
g.v.	**Iwaki**	W.	700	147 0	25 0	11 0	1	700	Japan	1883	..	..	..	1 5·9-in., 2 4·7-in.	..	10·0	600	115
„	**Idzumi** (ex Esmeralda)	S.	2950	270 0	40 0	18 3	2	6500	Elswick	1878	..	22	5–1	2 10 2-in. (Armstrong), 6 4·7-in. Q.F., 2 l. 6 M.	3	18·6	400	300
cr.	**Kasagi**	S.	5416	393 6	48 9	19 0	2	15,797	Philadelphia	1897	205,200	4½	4½–1¾	2 8-in., 10 4·7-in. Q.F., 12 12-pr., 6 1·8-in.	5	22·5	350 1000	405
t.c.	**Katsuraki**	S.	1476	206 9	36 0	15 0	2	1600	Japan	1885	..	..	..	2 6-in. (Krupp), 5 4·7-in., 2 M.	2	13·0	..	242
	Musashi																	
g.v.	**Maya**	S.	615	154 0	27 0	10 0	2	700	Japan	1886	..	..	..	1 8·2-in., 1 4 7-in., 2 M.	..	13·0	60	113
cr.	**Matsushima**	S.	4277	295 0	50 10	21 2	2	5100	La Seyne	1890	..	12	2	1 12·5-in. (Canet), 11 4 7-in. Q.F., 5 6-pr., 11 3-pr., 6 M.	4	17·5	400	350
„	**Miyaka**	S.	4800	314 9	36 0	13 2	2	6130	..	Bldg.	..	..	..	2 4·7-in. Q.F., 10 1·8-in.	2	20·0	..	..

cr.	**Naniwa** . . .	S.	3650	300	0	46	0	18	6	2	7235	Elswick .	1885	..	1½	3-2	2 10·2-in. (Armstrong), 6 5·9-in. (Krupp), 2 3-pr., 10 M. .	4	18·72	800	350
g.v.	**Oshima** . . .	S.	630	164	0	27	0	10	0	1	700	Japan .	1890	..	..	..	4 4·7-in., Q.F., 8 l. . .	..	13·0	..	..
cr.	**Sai yen** (ex Tsi Yuen) .	S.	2300	263	3	33	0	15	9	2	2800	Stettin .	1883	..	9	3	2 8 2-in., 1 5·9-in., 4 l. 10 M.	4	14·5	230	200
cr.	**Sei-ki** . . .	W.	900	200	0	30	6	14	2	1	720	Japan .	1875	..	..	..	1 5·9-in., 4 4·7 Q.F., 2 M. .	..	11·0	130	..
to.g.b.	**Shirane** . . .	S.	875	240	0	27	6	13	0	2	5500	Japan .	1896	..	..	..	2 4·7-in. Q.F., 4 3-pr. . .	5	21·0	200	..
cr.	**Suma** . . .	S.	2700	306	9	40	0	16	4	2	8500	Japan (Yokosuka) .	1896	237,000	..	2-1	2 6-in. Q.F., 6 4·7-in., 12 3-pr., 4 M.	2	20·0	200	..
„	**Takao** . . .	S.&W.	1774	230	0	33	0	13	0	2	2330	Japan .	1888	..	..	..	4 6-in. Q.F., 1 4¾-in. do., 6 M. .		15·0	300	255
„	**Takachiho** . .	S.	3700	300	0	46	0	18	6	2	7500	Elswick .	1885	..	1½	3-2	2 10·2-in. (Armstrong), 6 5·9-in., 2 3-pr., 10 M. . .	4	18·7	800	365
„ „	**Takasago** . . . Unnamed . . .	S.	4160	360	0	46	6	17	0	2	15,500 B	Elswick .	1897 Bldg.	..	4½	4½	2 8-in. Q.F., 10 4·7-in., 12 12-pr., 6 2½-pr.	5	23·0	800 1000	..
to.g.b.	**Tatsuta** . . .	S.	875	240	0	27	6	13	0	2	5500	Elswick .	1894	..	..	..	2 4·7-in. Q.F., 4 3-pdr. .	5	21·0	200	..
„	**Ten-riu** . . .	W.	1500	200	0	32	0	16	5	1	1250	Japan .	1882	..	..	..	1 6·6-in. (Krupp), 6 4·7-in., 2 l.	..	12·0	256	222
cr.	**Tsukushi** . . . (*ex* Arturo Prat)	S.	1350	210	0	32	0	15	0	2	2887	Elswick .	1882	..	4½	..	2 10-in. (Armstrong), 4 4·7-in. Q.F., 2 l., 4 M.	2	16·5	250	190
„	**Yayeyama** . .	S.	1600	315	0	34	6	15	0	2	5400	Japan	1889	..	..	..	3 4·7-in. Q.F., 6 M. . .	2	20·0	..	200
„	**Yamato** . . .	..	1476	206	9	36	0	15	0	1	1600	Japan .	1885	..	..	..	2 6·6-in. (Krupp), 5 4·7-in., 4 M.	2	13·0	..	242
„	**Yoshino** . . .	S.	4180	350	0	46	6	17	0	2	15,000	Elswick .	1892	..	4½	4½-1¾	4 6-in. Q.F., 8 4·7-in., 23 3-pr.	5	23·0	1000*	300

The Naval Programme, extending over ten years, includes four battleships, six first-class, three second-class, and two third-class cruisers, three torpedo gunboats, one torpedo depot ship, eleven destroyers, and eighty-nine torpedo-boats. In addition to the new ships included in the above tables, a 20-knot cruiser (9600 tons), three cruisers of 3000 tons, three torpedo gunboats, and a despatch vessel, one building, or to be built at Yokosuka.

The gunboats Chen-Pei, Chen Pien, Chen Nan, Chen Hsi, Chen Chung and Chen Tung (440 tons) were captured from the Chinese.

* Dimensions doubtful.

NETHERLANDS.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length. ft.	Length. in.	Beam. ft.	Beam. in.	Draught. ft.	Draught. in.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Turret.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.					inches.	inches.	inches.			knots	tons.	
c.d.s.t.	Bloedhond	I.	1683	182	8	46	3	10	6	2	680	Amsterdam	1869	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	7·7	104	118
„	Cerberus	I.	1584	185	8	44	0	9	9	2	534	Amsterdam	1869	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	7·0	80	118
„	Draak	I.	2234	213	6	49	2	12	0	2	807	Amsterdam	1877	..	8	11	1	2 11-in. (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	100	133
„	Evertsen	S.	3400	282	9	47	0	16	9	2	4735	Flushing	1894	..	6 H.S.	9½ H.S.	2	3 8·2-in., 2 5·9-in., 6 2·9-in. Q.F., 8 1·4-in.	3	16·0	280	260
c	Gelderland	—	4033	310	8	48	6	17	8	2	9750 Y	Feijenoord	1898	..	6	9½	2¼	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 4 1·4-in., 4 M.	4	20·0	850	..
c.d.s.t.	Haai	I.	1580	195	2	44	0	9	6	2	672	Rotterdam	1871	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	76	118
„	Heiligerlee	I.	1543	187	0	44	0	9	6	2	630	Birkenhead	1868	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	9·0	120	118
„	Hyena	I.	1580	192	2	44	0	9	6	2	654	Amsterdam	1870	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	7·0	76	118
a.g.b.	Isala	I.	383	159	4	25	0	4	5	2	306	Amsterdam	1876	..	5	5	1	2 4·7-in. (Krupp)	..	7·7	28	44
t.	Koning der Nederlanden (I)	I.	5400	279	9	49	9	19	8	2	4500	Amsterdam	1874	..	7½	9½	¾	4 11-in., 4 4·7-in., 2 2·9-in., 6 1·4-in., 4 1·4-in. Q.F.	..	12·0	520	308
c.d.s.t.	Koningin Regentes	S.	4950	316	10	51	6	21	8	2	5300 Y	Amsterdam	Bldg.	347,500	6 N.S.	10 N.S.	2	2 9·4-in., 4 5·9 Q.F., 4 2·9-in., 8 1·4-in.	3 2 sub.	16·0	680	..
t. & b.	Koningin Wilhelmina der Nederlanden *	S. shd.	4600	327	5	48	10	20	0	2	5900	Amsterdam	1892	..	..	11	3	1 11-in., 1 8·2-in., 2 6·6-in., 2 2·9-in., 4 2·9-in. Q.F., 4 1·4-in., 6 1·4-in. Q.F., 2 M.	4	16·5	448	274
c.d.s.t.	Kortenaer	S.	3400	282	9	46	11	16	9	2	4658	Amsterdam	1894	..	6 H.S.	9½ H.S.	2	3 8·2-in., 2 5·9-in., 6 2·9-in. Q.F., 8 1·4-in.	3	16·0	280	260
„	Krokodil	I.	1547	187	0	44	0	9	8	2	630	Birkenhead	1868	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	9·0	120	118
„	Luipaard	I.	1610	194	9	44	0	9	7	2	680	Rotterdam	1876	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	9.0	120	118

c.d.s.t	**Matador**	I.	2000	209	6	47	3	10	6	2	691	Rotterdam .	1878	..	5½	11	..	2 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	7·5	100	130
a.g.b.	**Merva**	I.	383	159	4	24	11	4	5	2	395	Amsterdam .	1879	..	5	5	1	2 4·7-in. (Krupp) . . .	..	8·0	28	44
„	**Mosa**	I.	373	159	6	24	11	4	5	2	400	Amsterdam .	1878	..	5	5	1	2 4·7-in. (Krupp) . . .	..	8·0	28	44
cr.	**Noord-Brabant** . .	..	4033	310	8	48	6	17	8	2	9750 Y	Flushing .	Bldg.	..	6	9½	2¼	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 4 1·4-in., 4 M.	4	20·0	850	..
c.d.s.t.	**Panter**	I.	1580	159	3	44	0	9	6	2	560	Amsterdam .	1870	..	5½	9½	..	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	7·0	76	118
c.d.s.t.	**Piet-Hein** . . .	S.	3400	282	9	46	11	16	9	2	4736 (t)	Rotterdam .	1894	..	6 H.S.	9½ H.S.	2	3 8·2-in., 2 5·9-in., 6 2·9-in., Q.F., 8 1.4-in.	3	16·2 (t)	280	260
t.	**Prins Hendrik der Nederlanden**	I.	3375	240	0	44	0	17	10	2	2000	Birkenhead .	1866	..	4½	10	⅝	4 9-in. 13-ton M.L.R. (Armstrong), 4 4·7-in. (Krupp), 2 2·9-in., 4 1·4-in. Q.F., 6 M.	..	11·0	380	228
t. & b.	**Reinier Claeszen** . .	S.	2479	229	5	44	4	15	0	2	350	Amsteram .	1891	..	4⅜–2 *comp.*	11	3	1 8·2-in. (Krupp), 1 6·6-in., 1 2·9-in., 4 1·9-in. Q.F., 3 1·4-in.,	2	12·5	88	160
a.g.b.	**Rhenus**	I.	388	160	5	25	0	4	6	2	310	Amsterdam .	1877	..	5	5	1	2 4·7-in. (Krupp) . . .	..	7·5	28	44
c.d.s.t.	**Schorpioen** . . .	I.	2235	205	0	38	0	16	6	2	2225	La Seyne .	1868	..	6	11	1	1 11-in. 28-ton (Krupp), 2 2·9-in., 5 3-pr. Q.F., 2 M.	..	13·0	200	160
„	**Stier**	I.	2112	205	0	38	0	16	4	2	2250	Birkenhead .	1868	..	11	8	1	1 11-in. 28-ton (Krupp), 2 2·9-in., 5 3-pr. Q.F., 2 M.	..	12·4	160	154
cr.	**Utrecht**	..	4033	310	8	48	6	17	8	2	9750 Y	Amsterdam .	1898	..	6	9½	2¼	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 4 1·4-in., 4 M.	4	20·0	850	..
a.g.b.	**Vahalis**	I.	365	126	0	27	9	5	3	2	240	Rotterdam .	1870	..	4	1	½	2 3-pr. Q.F.	..	7·5	24	34
c.d.s.t.	**Wesp**	I.	1580	195	2	44	0	9	6	2	740	Amsterdam .	1871	..	5½	9½	1	1 11-in. 28-ton (Krupp), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	76	118

* Three other armoured rams, Evertsen type, are projected.

NETHERLANDS.—Cruising Ships.

((I) denotes vessels of the Dutch Indian Navy.)

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.			knots.	tons.	
cr	Alkmaar	Cp. shd.	1068	178	9	30	2	15	7	1	686	Amsterdam	1874	..	..	..	1 5 9-in. (Krupp), 6 4·7-in., 1 2·9-in., 4 1·4-in. Q.F., 2 M.	..	10·0	130	112
c.	Atjeh	I. & W.	3440	301	0	41	0	21	4	1	2700	Amsterdam	1876	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 8 3-pr. Q.F., 8 smaller.	..	13·5	440	301
g. v.	Bali (I)	I. & W. shd.	853	175	9	29	6	21	1	1	400	Rotterdam	1878	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·0	80	104
"	Batavia (I)	I. & W. shd.	850	175	6	29	6	11	10	1	400	Amsterdam	1876	..	..	..	1 7-in. 7-ton M.L.R. (Armstrong), 2 4·7-in. (Krupp), 1 2 9-in., 2 1·4-in. Q.F.	..	9·0	95	104
"	Bellona	I.	920	178	5	32	9	12	6	1	310	Amsterdam	1892	..	..	..	1 5·9-in., 7 4·7-in., 3 2·9-in., 13 smaller.	..	8·5	50	87
"	Benkoelen (I)	I. & W. shd.	853	147	7	29	6	11	10	1	446	Rotterdam	1879	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·5	100	99
"	Bonaire	I. & W. shd.	853	175	6	29	6	12	7	1	412	Rotterdam	1877	..	..	..	1 5·9-in., 2 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F., 2 M.	..	9·0	104	84
"	Borneo (I)	Cp. shd.	800	176	6	31	0	13	4	1	1040	Glasgow	1892	..	..	..	6 4·1-in., 1 2·9-in., 2 1·4-in. Q.F., 2 M.	..	13·0	124	106
"	Ceram (I)	S. & W. shd.	550	173	2	25	7	10	3	1	800	Flushing	1887	..	..	..	3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	12·5	70	82
"	Condor (I)	Cp. shd.	350	126	0	20	0	10	0	1	300	Amsterdam	1885	..	..	..	1 2·3-in., 2 2-in.	..	10·0	26	40
cr.	De Ruyter	I. & W. shd.	3517	302	1	41	0	22	1	1	3300	Amsterdam	1880	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 8 3-pr. Q.F., 8 smaller.	..	14·5	360	30
g. v.	Edi (I)	S.	810	166	0	30	9	11	9	2	1100	Flushing	Bldg.	..	..	..	3 4·7-in. Q.F., 2 2·9-in., 4 1·4-in.	..	13·0	113	95
"	Flores (I)	S. & W. shd.	550	178	2	25	7	11	4	1	650	Amsterdam	1887	..	..	..	3 4·7-in, 1 2·9-in., 2 1·4-in. Q.F.	..	11·7	75	82
cr.	Friesland	S.	3900	306	0	48	6	17	8	2	10416 Y	Rotterdam	1896	285,700	..	2	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 smaller.	4	19·8 (?)	400	306

cr. .	Holland . . .	S.	3900	306	0	48	6	17	8	2	54[illegible] Y	Amsterdam .	1896	285,700	..	2	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 M.	4	19·6 (l)	400	806
g.v. .	Java (I) . . .	I. & W. shd.	1300	205	4	31	2	14	1	1	1050	Rotterdam .	1885	..	..	..	1 5·9-in., 3 4·7-in., 1 2·9-in., 2 1·4-in. Q.F.	..	12·5	160	114
cr. .	Johan Willem Friso	I. & W. shd.	3732	302	1	41	4	22	8	1	3133	Amsterdam .	1886	..	..	..	6 6·6-in. 6-ton (Krupp), 8 4·7-in., 2 2·9-in., 8 3-pr. Q.F., 8 M.	2	14·5	400	301
cr. .	Koningin Emma der Nederlanden	I. & W. shd.	3528	301	0	41	0	21	4	1	2730	Amsterdam .	1879	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 8 3-pr. Q.F., 8 M.	..	14·0	470	301
g.v. .	Lombok (I) . . .	S. & W. shd.	600	172	0	27	3	11	0	1	990	Amsterdam .	1891	..	..	..	3 4·7-in., 1 2·9-in., 2 3-pr. Q.F. .	..	12·0	55	87
„	Makasser (I) . .	I. & W. shd.	850	177	0	29	6	11	10	1	320	Amsterdam .	1877	..	..	..	1 6·3-in. 7-ton M.L.R. (Armstrong). 2 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	8·5	96	104
„	Madura (I) . .	I. & W. shd.	853	177	0	29	6	11	10	1	400	Amsterdam .	1880	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·0	85	104
„	Mataram (I) . .	S.	810	166	0	30	9	11	9	2	1100	Amsterdam .	1896	..	..	..	3 4·7-in. Q.F., 2 3-in., 2 1·4-in.	..	13·0	113	95
„	Nias (I) . . .	S.	810	166	0	30	9	11	9	2	1227	Amsterdam (Huygens)	1895	..	..	..	3 4·7-in. Q.F., 2 2·9-in., 4 1·4-in.	..	13·0	120	95
„	Padang (I). . .	I. & W. shd.	853	176	6	29	6	11	10	1	400	Rotterdam .	1878	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·0	80	104
„	Pelikaan (I) . .	S. & W. shd.	400	131	2	24	1	8	8	..	485	Rotterdam .	1891	..	..	..	3 4·7-in. Q.F., 1 3-in., 2 3-pr. do. .	..	11·35	43	40
„	Pontianak (I) . .	C. shd.	730	163	8	30	3	11	9	1	360	Amsterdam .	1873	..	..	..	1 6·3-in. 7-ton M.L.R. (Armstrong), 2 4·7-in. (Krupp), 1 2·9-in., 2 1·4-in. Q.F.	..	9·5	90	104

NETHERLANDS.—Cruising Ships—*continued.*

((I) denotes vessels of the Dutch Indian Navy.)

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.			knots.	tons.	
„	Sambas (I)	C.	654	137	10	28	10	11	10	1	374	Rotterdam	1874	..	..	..	1 7-in. 7-ton M.L.R. (Armstrong), 2 4·7-in. (Krupp), 1 2·9-in., 1 1·4-in. Q.F.	..	8·5	85	100
„	Serdang (I)	S	810	166	0	30	9	11	9	2	1100	Flushing	1897	..	..	..	3 4·7-in. Q.F., 2 2·9-in., 4 1·4-in.	..	13·0	113	95
sl.	Sommelsdijk	I. & W. shd.	1013	178	5	31	0	14	0	1	700	Amsterdam	1881	..	..	..	1 5·9-in., 3 4·7-in. (Krupp), 1 2·9-in.	..	10·0	150	88
cr.	Sumatra (I)	S.	1720	229	6	37	0	14	0	2	3750	Amsterdam	1890	..	..	1½	1 8·2-in., 1 5·9-in., 2 4·7-in., 1 2·9-in., 4 3-pr. Q.F., 2 M.	2	17·0	225	183
g.v.	Sumbawa (I)	S.	600	174	6	26	6	11	4	1	930	Flushing	1891	..	..	..	3 4·7-in., 1 2·9-in., 2 3-pr. Q.F.	..	12·5	60	87
„	Suriname	I. & W. shd.	884	177	0	29	6	11	5	1	440	Amsterdam	1877	..	..	..	1 5·9-in. (Krupp), 2 4·7-in., 1 2·9-in., 2 1·4-in. Q.F., 3 M.	..	9·0	105	84
cr.	Tromp	I. & W. shd.	3512	301	0	41	0	21	4	1	2772	Amsterdam	1877	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 6 3-pr. Q.F., 2 M.	..	14·0	470	301
cr.	Van Speyk	I. & W. shd.	3728	302	1	41	0	23	0	1	2891	Amsterdam	1880	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (Krupp), 2 2·9-in., 6 3-pr. Q.F., 2 M.	..	14·0	360	301
cr.	Zeeland	S.	3900	306	0	48	6	17	8	2	10539 Y *t.*	Flushing	1897	285,700	..	2	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 M.	4	19·4 *t*	400	306
g.v.	Zwaluw (I)	I. & W. shd.	340	126	0	20	0	10	0	1	240	Flushing	1882	..	..	..	2 3-in., 2 2-in.	..	10·0	26	40

Gun-vessels of the Indian Navy, Arend, Flamingo, Raaf, Reiger, Valk, Zeeduif, and Zwaan (400 tons), launched between 1880 and 1891; Glatik (417 tons), 1894; Argus and Cycloop (438 tons), 1893; Sindoro and Soembing (642 tons), built at Soerabaia, 1877–78.

Sixteen Gunboats (*Staunch class*) of 268 tons, and of 100 to 171 H.P.; also *five small gunboats*, of 210 tons, and 124 to 174 H.P., and *one steel gunboat* of 108 tons and 172 I.H.P. The new programme provides for the building of *twenty-two gun-vessels* and despatch boats for the defence of the Zuyder Zee and Hollandisch Diep.

NORWAY.—Armoured Ships.

Class.	NAME	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.	in.			knots.	tons.	
c.s., t.	Mjölner	I.	1515	203 5	45 11	11 10	1	450	Norrkoping	1868	66,800	5	12	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.	..	8·0	138	80
„	Harald Haarfagre	S.	3556	280 0	48 6	16 6	2	3700	Low Walker	1896	190,000	7 H.S.	8	2	2 8-in. Q.F., 6 4·7-in., 6 12-pr., 6 1½-pr.	2 (sub)	17·2†	200	..
„	Torkenskjold									Bldg.							t.	500	
„	Skorpionen	I.	1447	200 2	45 11	11 6	1	350	Horten	1866	..	5	12	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.	..	6·0	138	80
„	Thor	I.	2003	203 5	49 3	13 2	1	600	Horten	1872	..	7	14½	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.	..	8·0	200	90
„	Thrudvang	I.	1515	200 2	45 11	11 10	1	500	Horten	1867	..	5	12	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.	..	8·0	138	80
c.d.s.t.	2 Unnamed	S.	4500	290 0	50 6	16 6	2	3850 W. T.	Elswick	Bldg.	..	6 N.S.	5 N.S.	..	2 8·2-in., 6 5·9-in. Q.F., 8 12-pr., 6 3-pr.	2 (sub)	16·5	250 / 400	..

† Natural draught.

Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
g.b.	Æger	S.	393	108 6	29 6	8 0	2	450	Horten	1892	..	..	1½	1 8·2-in., 1 2·7-in. Q.F., 2 1·9-in.	..	9·0	..	..
g.v.	Ellida	W.	1000	187 0	32 8	14 4	2	900	Horten	1880	..	..	..	5 5·9-in. 4-ton (Krupp), 1 4·7-in., 1 l., 2 M.	1	12·0	97	128
„	Frithjof	S.	1371	216 6	32 10	13 3	2	300	Horten	1896	..	..	..	2 4·7-in. 4 2·9-in. Q.F., 4 1·4-in., 2 l.	3 (1 sub.)	..	..	..
„	Heimdal	S.	630	167 3	26 9	11 8	1	700	Christiania	1892	..	..	..	4 2·5-in. Q.F.	..	12·0	22	..
corv.	Nord Stjernen	W.	1609	216 6	39 4	17 9	1	800	Horten	1862	..	..	..	6 6·2-in. 3-ton M.L.R., 10 8-in. smooth-bore, 3 l.	..	9·0	195	216
g.v.	Sleipner	I.	580	173 10	25 11	9 6	2	800	Horten	1877	..	..	..	1 10·2-in. 22-ton (Krupp), 1 5·9-in. 4-ton do., 1 M.	1	12·0	80	87
to g.b.	Valkyrien	S.	330	190 0	24 2	9 2	2	3300	Elbing	1896	..	..	..	2 2·7-in. Q.F., 1 M.	2	23·2 t	..	..
g.v.	Viking	S.	1113	203 6	30 6	13 0	2	2000	Horten	1891	..	..	1½	2 5·9-in. (Arms.), 4 2·5-in Q.F., 4 1·4-in., 2 M.	3	15·0	140	..

Eleven Gunboats, of 189 to 280 tons, and of 180 to 450 I.H.P., armed with one large gun and machine guns in each.
Sixteen smaller Gunboats, of 60 tons, 70 I.H.P., and 7½ knots speed; each armed with one 5½-inch gun. **Also several smaller gunboats.**
A first-class gunboat, No. 4, of 395 tons, in hand.

PORTUGAL.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Battery.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots	tons.	
c.b.	**Vasco da Gama** . .	I.	2422	200 0	40 0	18 0	2	3600	Blackwall .	1876	132,000	9	10	3	2 10·2-in. 18-ton (Krupp), 1 5·9-in., 2 2·5-in., Q.F., 2 M.	..	13·2	280	218
c.d.s.	2 Unnamed . . .	S.	2500	229 8	42 8	13 6	2	3000	..	Pro.	..	7¾	7¾	2	2 9·4-in., 4 4·7-in. Q.F., 4 1·8-in., 4 M.	2	15·0	..	..

Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
cr.	**Adamastor** . .	S.	1993	250 0	35 0	14 0	2	4000	Leghorn .	1896	..	5	3	2 5·9-in. Q.F., 4 4·7-in., 4 2·2-in., 4 M.	3	18·0 t.	..	..
corv.	**Affonso de Albuquerque**	I. & W.	1111	203 0	33 0	13 6	1	1360	Blackwall .	1884	56,500	..	..	2 6-in. (Armstrong), 5 4·7-in., 2 2·5-in. Q.F., 2 M.	..	13·3	140	183
„	**Bartholomeu Dias** .	W.	2377	207 0	37 5	20 6	1	400 (nom.)	Blackwall .	1858	..	..	..	8 5-in.	..	10·0	360	271
g.v.	**Bengo**	I. & W.	462	125 6	24 6	9 0	1	400	Birkenhead .	1879	22,500	..	..	1 6-in., 2 3·4-in. . . .	..	10·0	80	88
„	**Diu**	W.	729	147 0	27 6	13 0	1	700	Lisbon .	1889	..	..	..	1 5·9-in. (Krupp), 2 4·7-in., 1 3-pr. Q.F., 2 M.	..	12·0	80	114

cr.	**Dom Carlos I.**	S. shd.	4100	360 0	46 6	17 6	..	12,500 W.T.	Elswick	1898	..	..	4	4 6-in. Q.F. (Armstrong), 8 4·7-in., 12 3-pr., 6 1-pr., 4 M.	5 (2 sub.)	22·0	1000	..
g.v.	**Dom Luiz I.**	S.	721	151 0	27 3	13 8	2	512	Lisbon	1895	..	..	..	4 4·1-in., 3 2·5-in. Q.F., 3 M.	..	9·9	100	..
„	**Douro**	W.	587	142 9	26 0	11 0	1	400	Lisbon	1873 1877	..	..	..	1 5·9-in. 4-ton, 2 4·7-in., 1 M.	..	10·0	85	107
corv.	**Duque da Terceira** (training)	W.	1430	179 6	34 0	15 6	1	660	Lisbon	1864	..	..	..	2 4·7-in., 2 2·5-in. Q.F., 1 M.	..	9·0	130	178
g.v.	**Liberal**	I. shd.	580	140 0	25 6	10 6	1	580	Birkenhead	1884	32,500	..	..	1 6-in. 4-ton (Armstrong), 3 4-in., 2 M.	..	11·0	90	109
corv.	**Mindello**	C.	1124	170 0	35 9	14 0	1	900	Blackwall	1876	74,500	..	..	2 7-in. 4-ton M.L.R. (Armstrong), 4·47-in. 2 M.	..	11·5	130	169
g.v.	**Mandovi**	I. shd.	462	125 6	24 6	9 0	1	400	Birkenhead	1879	22,500	..	..	1 5·9-in., 2 3·4-in., 2 M.	..	10·0	80	86
„	**Quanza**	W.	587	142 9	26 0	11 0	1	500	Lisbon	1877	..	..	..	1 5 9-in. 4-ton, 2 4·7-in., 1 M.	..	10·0	85	107
corv.	**Rainha de Portugal**	C.	1124	170 0	35 9	14 0	1	900	Blackwall	1876	74,500	..	..	2 7-in. M.L.R. (Armstrong), 4 4·7-in., 2 M.	..	11·5	130	169
cr.	**Rainha Amelia**	S.	1660	246 0	36 0	14 8	2	4500	Lisbon	Bldg.	..	..	..	4 5·9-in. Q.F., 4 3·9-in., 2 3-pr., 6 M.	2	17·5	..	..
g.v.	**Rio Ave**	W.	378	120 0	22 0	10 6	1	180	Lisbon	1880	..	..	..	1 4·7-in. (Armstrong), 2 3-in.	..	8·0	60	90
„	**Rio Lima**	I. shd.	638	148 6	27 6	10 6	1	500	Birkenhead	1875	33,000	..	..	1 7-in. 4-ton (Armstrong), 4 4-in., 2 M.	..	11·0	100	109
„	**Sado**	C.	645	148 6	28 0	10 6	1	500	Birkenhead	1875	35,500	..	..	1 7-in. 4-ton (Armstrong), 4 4·7-in., 1 M.	..	11·0	100	109
cr.	**São Gabriel** / **São Rafael**	S. shd.	1800	246 0	35 6	14* 3	2	2650	Havre	1898	..	..	1½	2 5·9-in. (Canet), 4 4·7-in., 8 1·8-in., 4 M.	1	17·0	500	..
g.b.	**São Salvador**	S.	721	151 0	27 3	13 8	2	..	Lisbon	Bldg.	..	..	..	4 4·1-in., 3 5·2-in. Q.F., 3 M.	..	11·0	100	..
„	**Tamega**	C.	645	148 6	28 0	10 6	1	500	Birkenhead	1875	35,500	..	..	1 7-in. 4-ton (Armstrong), 4 4·7-in., 1 M.	..	11·0	100	109
„	**Tejo**	W.	587	142 9	26 0	11 0	1	400	Lisbon	1869	..	..	..	1 5·9-in. 4-ton, 2 4·7-in.	..	10·0	85	107
„	**Vouga**	W.	730	160 9	27 6	12 0	1	600	Lisbon	1882	..	..	..	4 4-in., 2 1·8-in. Q.F., 2 M.	..	10·0	100	109
„	**Zaire**	I. shd.	580	140 0	25 6	10 6	1	580	Birkenhead	1884	32,500	..	..	1 6-in. (Armstrong), 3 4-in. 2 M.	..	11·0	90	109
„	**Zambeze**	W.	641	143 0	25 9	12 0	1	500	Lisbon	1886	..	..	..	1 6-in. (Armsg.), 2 4-in., 2 M.	..	10·0	85	107
g.v.	One unnamed	S.	300	..	..	..	..	..	Lisbon	Bldg.	..	..	..	.. .. ..	..	..	..	..

* Mean draught. † Bunker capacity.

Fifteen small Gunboats and about 29 light draught steel river-gunboats. Two gunboats of 220 tons, the Al. Baptista de Andrade and Thomaz Andrea, are building for Mozambique and Timor.

RUSSIA.—Armoured Ships.

(B.S., Black Sea Fleet.)

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.			Armament.		Speed.	Normal Coal Supply.	Complement.
															Belt.	Gun Position.	Deck Plating.	Guns. B.L.R. are of Russian Krupp pattern.	Torpedo Tubes.			
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.	in.			knots.	tons.	
c.d.s., t.	Adm. Chichagoff .	I.	3505	254	0	42	7	18	0	1	2060	St. Petersburg.	1868	..	6	6	..	2 11-in. 28-ton, 4 4-pr., 6 Q.F., 4 l.	..	10·5	300	264
,,	Adm. Greig . .	I.	3462	254	0	42	7	17	6	1	2031	St. Petersburg.	1868	..	4½	6	..	3 11-in. 28-ton, 6 Q.F., 2 l. .	..	10·0	300	280
,,	Adm. Lazareff . .	I.	3462	254	0	43	0	17	6	1	2004	St. Petersburg.	1867	..	4½	6	..	3 11-in. 28-ton, 6 Q.F., 4 l.	..	10·25	300	280
a.c.	Adm. Nahimoff .	S. shd.	8524	333	0	61	0	25	0	2	8000	St. Petersburg.	1885	572,000	10 comp.	8 comp.	3	8 8-in., 10 6-in., 10 Q.F., 4 3-pr., 6 M.	4	16·7	1200	567
c.d.s., t.	Adm. Boutakoff .												Bldg.									
,,	Adm. Oushakoff .	S.	4126	265	0	52	6	17	0	2	5000	St. Petersburg	1893	410,000	10	7–8	3	4 9-in., 4 6-in. Q.F., 6 1·8-in. Q.F., 8 M.	4	16·0	400	318
,,	Adm. Seniavin. .												1894									
c.d.s., t.	Adm. Spiridoff . .	I.	3505	254	3	42	7	19	1	1	2007	St. Petersburg.	1868	..	6	6	..	2 11-in. 28-ton, 4 4-pr., 6 Q.F., 4 l.	..	10·5	300	260
b.	Alexander II. .	S. shd.	9927	326	0	67	0	23	0	2	8000	St. Petersburg.	1887	..	14 comp.	10 comp.	2½	2 12-in. 50-ton, 4 9-in. 19-ton, 8 6-in., 4 6-pr. Q.F., 4 3-pr., 6 M.	5	16·5	1200	604
a.c.	Bayan . . .	S.	7800	445	0	57	0	21	2	2	16,500 B	La Seyne .	Bldg.	..	7¾	..	..	2 8-in., 8 6-in. Q.F., 20 2·9-in., 7 1·8-in.	..	21	..	..
b.	Catherine II. (B.S.) .	I. & S.	10,180	331	0	69	0	26	6	2	10,600 B	Nicolaieff .	1886	900,000	16 comp.	14 comp.	3	6 12-in. (56-ton), 7 6-in., 8 6-pr. Q.F., 6 M.	7	15·5	886	325
c.d.s., t.	Charodeika . .	I.	1881	206	9	42	7	10	6	2	786	St. Petersburg.	1867	..	4½	6	1	4 9-in., 2 Q.F. and 2 M. .	..	8·0	250	171
a.c.	Dmitri Donskoi .	S. shd.	5882	296	5	52	0	24	4	2	7000	St. Petersburg.	1883	..	6	unard.	2½	2 8-in., 4 6-in. Q.F., 10 4·7-in. Q.F., 16 Q.F. and M., 4 l.	4	16·5	400	510
t.	Dvenadzat Apostoloff (Twelve Apostles) B.S.	S.	8076	330	0	60	0	25	6	2	11,500	Nicolaieff .	1890	..	14 comp.	12 comp.	2½	4 12-in. 52-ton, 4 6-in., 8 3-pr. Q.F., 10 M.	6	16·6	800	500

t.	**Gangoot***	S.	6592	278	0	62	0	21	0	2	8300	St. Petersburg	1890	..	16 *comp.*	7·8	2½	1 12-in., 4 9-in., 4 6-in., 10 Q.F.	5	14·7	500	58
a.c.	**General Admiral**	I. shd.	4722	285	5	49	3	21	0	1	4472	St. Petersburg	1873	..	6	..	..	6 8-in., 2 6-in., 10 Q.F. and M., 5 l.	4	14·2	1000	312
c.d.s.	**General Admiral Apraxine**	S.	4126	265	0	52	6	17	0	2	5757 (*t*)	St. Petersburg (New Admiralty)	1896	..	10	7·8	3	4 9-in., 4 6-in., 6 1·8-in. Q.F., 8 1·4-in.	4	15·0 (*t*)	215	318
a.c.	**Gertzog Edinburgski**	I. & W.	5050	285	5	49	3	21	0	1	5222	St. Petersburg	1875	..	6	6	..	4 8-in., 5 6-in., 12 Q.F., 6 l.	2	15·2	1000	500
b.	**Georgi Pobiedonosets** (George the Victorious) B.S.	S.	10,280	320	0	69	0	26	7	2	10,600 13,468 (*t*)	Sebastopol	1892	431,000	16	12	..	6 12-in. 56-ton, 7 6-in., 8 3·9-in. Q.F., 6 M.	7	16·5	700	500
a.g.b.	**Gremiastchy**	S.	1500	225	0	41	0	11	0	2	2500 B	St. Petersburg	1892	..	5	..	1½	1 9-in., 1 6-in., 10 Q.F.	2	15·0	100	142
a.c.	**Gromoboi**	S.	12,336	473	0	68	6	26	0	..	..	St. Petersburg (Baltic)	Bldg.	..	6	..	..	4 8-in. Q.F., 16 6-in., 6 4·7-in., 14 3-in., 20 1·8-in., 16 1·4-in., 2 l.	5	..	..	..
a.g.b.	**Grozjastchy**	S.	1492	229	0	41	8	11	0	2	2000 B	St. Petersburg	1890	..	5	..	1½	1 9-in., 1 6-in., 8 Q.F.	2	15·0	100	120
,,	**Khrabry**	S.	1492	229	0	41	8	11	0	2	3000 Nic.	St. Petersburg (New Admiralty)	1895	..	5	..	1½	1 9-in., 1 6-in., 8 Q.F.	2	15·0	100	120
c.b.	**Kniaz Pojarski**	I.	5138	272	4	49	3	23	11	1	2835	St. Petersburg	1867	..	4½	4½	..	2 8-in., 2 6-in., 10 Q.F. and M., 4 l.	..	11·0	600	452
t.	**Kniaz Potemkine Tavritchesky**, B.S.	S.	12,480	358	0	73	0	27	0	2	10,600 B	Nicolaieff	Bldg.	..	9	10	2½	4 12-in., 10 6-in. Q.F., 16 3-in., 16 1·8-in., 14 1·4-in., 2 l.	5	17·0	900†	636
c.d.s., br.	**Kreml**	I.	3480	219	10	52	5	15	0	1	2822	St. Petersburg	1864	..	4½	4½	..	8 8-in., 6 6-in., 5 Q.F., 6 l.	..	9·0	..	63
a.c.	**Minin**	I.	6136	298	6	49	3	25	3	1	6000 B	St. Petersburg	1878 altd.	..	7	8	..	4 8-in., 12 6-in., 16 Q.F., 4 l.	..	14·0	1200	450
c.d.s., br.	**Netron-Menya**	I.	3494	219	10	53	0	15	6	1	1600	St. Petersburg	1864	..	4½	4½	..	14 8-in., 4 Q.F., 2 M., 4 l.	1	9·0	500	63
t.	**Navarin**	S.	10,206	338	0	67	0	25	0	2	9000	St. Petersburg	1891	772,995	16	12	..	4 12-in., 8 6-in., 14 Q.F., 4 l.	6	16·0	1200	..
t.	**Nicolai I.**	S. shd.	9672	326	0	67	0	23	0	2	8000 B	St. Petersburg	1888	453,000	14 *comp.*	10 tur. 6-in. b. *comp.*	2½	2 12-in. 52-ton, 4 9-in. 19-ton, 8 6-in., 12 Q.F., 8 M., 4 l.	6	14·8	..	604
cir. c.d.s.	**Novgorod**, B.S.	I. shd.	2706	101	0	101	0	13	0	6	2000	Nicolaieff	1873	..	9–7	9	..	2 11-in., 8 Q.F., 2 M., 2 l.	..	6·0	200	150
t.	**Oslabya**	S.	12,674	434	6	71	6	26	0	3	14,500	St. Petersburg (New Admiralty)	1898	..	9½ H. S.	9 H. S.	2¾	4 10-in., 11 6-in. Q.F., 16 3-in., 10 1·8-in., 17 1·4-in., 2 l.	6	18·0	1063 2056	732

* Foundered near Viborg, June 24th, 1897. Efforts are being made to refloat the vessel.

† And liquid fuel.

RUSSIA.—Armoured Ships—*continued.*

(B.S., Black Sea Fleet.)

Class.	NAME.	Material of Hull.	Displacement.	Length. ft.	Length. in.	Beam. ft.	Beam. in.	Draught. ft.	Draught. in.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns. B.L.R. are of Russian Krupp pattern.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.					£	inches.	inches.	inches.			knots.	tons.	
a.g.b.	**Otvazny** . . .	S.	1500	225	0	41	0	11	0	2	2000 2589 (*t*) B	St. Petersburg	1892	..	5	..	1½	1 9-in., 1 6-in., 10 Q.F. .	2	15·0 15.5 (*t*)	100	142
a.c.	**Pamyat Azova** . .	S. shd.	6675	377	0	51	0	23	0	2	8000	St. Petersburg	1888	350,000	9 comp.	8 comp.	2½	2 8-in., 13 6-in., 14 Q.F., and 3 M.	7	18·8	1000	525
t.	**Peresviet** . . .	S.	12,674	434	0	71	9	26	0	3	14,500	St. Petersburg. (Baltic)	1898	..	9½ H. S.	9 H. S.	2¾	4 10-in., 11 6-in. Q.F., 16 3-in., 10 1·8-in., 17 1·4-in., 2 l.	6	18·0	1063 2056	732
c.d.s., br.	**Pervenetz** . . .	I.	3279	219	10	52	5	14	9	1	1067	Blackwall .	1863	..	4½	4½	..	6 8-in., 9 6-in., 7 Q.F., 8 l. .	..	9·0	..	63
t.	**Peter Veliky** . .	I.	9891	328	2	62	4	23	9	2	8258	St. Petersburg	1872	..	14-8	8-6	3	4 12-in. 40-ton, 13 Q.F., 4 l. .	1	14·5	1200	436
t.	**Petropavlovsk** . .	S.	10,960	367	6	69	0	26	0	2	14,213 (*t*)	St. Petersburg	1894	1,098,000	15¾	10 H. S.	3½	4 12-in., 12 5·9-in. Q.F., 34 smaller.	6	16·3*t*	900	..
t.	**Poltava** . . .	S.	10,960	367	6	69	0	26	0	2	11,255 (*t*)	St. Petersburg	1894	1,098,000	15¾	10 H. S.	3½	4 12-in., 12 5·9-in. Q.F., 34 smaller.	6	16 2	900	..
b.	**Pobieda** (Victory) .	S.	11,362	425	0	71	0	26*	0	3	16,000 W.T.	St. Petersburg (Baltic)	Bldg.	..	9½ H. S.	9 H. S.	2¾	4 10-in., 11 6-in. Q.F., 16 3-in., 10 1·8-in., 17 1·4-in., 2 l.	6	18·0	1063 2056	732
b.	**Retwisan** . . .	S.	12,700	374	0	72	2	25	0	2	16,000 Nic.	Philadelphia .	Bldg.	..	9 K. S.	10 K. S.	4	4 12-in., 12 6-in. Q.F., 20 3-in., 20 3-pr., 6 1-pr.	..	18·0	1616 2000	..
a. c.	**Rossia** . . .	S.	12,130	480	0	68	6	25	0	3	14,500 B	St. Petersburg	1896	..	10	..	2½	4 8-in., 16 6-in., 6 4·7-in. Q.F., 18 small Q.F. & M.	5	20·0	2500	725
t.	**Rostislav, B.S.** . .	S.	8880	341	0	66	6	24	0	2	8,500	Nicolaieff .	1896	..	15¾ comp.	15¾ comp.	2-3	4 10-in., 8 5·9-in. (Canet), 12 1·8-in. Q.F., 4 1·5-in.. 2 M.	2-3	16·0	550† 800	..
a. c.	**Rurik**	S.	10,923	396	6	67	0	26	0	2	13,250	St. Petersburg .	1894	..	10 comp.	..	2½	4 8-in., 16 6-in., 6 4·7-in. Q.F., 18 small Q.F. & M.	5	18·0	2000	768
t.	**Sevastopol** . . .	S.	10,960	367	6	69	0	26	0	2	18,600	St. Petersburg .	1895	1,098,000	15¾	10 H. S.	3½	4 12-in., 12 5·9-in. Q.F., 34 smaller.	6	17·5	900	..

b.	Sinope, B.S.	I. & S.	10,180	331	0	69	0	26	6	2	13000	Sebastopol	1887	900,000	16 comp.	14 comp.	3	6 12-in. 50-ton, 7 6-in., 8 Q.F., 6 M.	7	16·75	886	[illegible]
t.	Sissoi Veliky (Sissoi the Great)	S.	8880	341	0	66	6	24	0	2	8500	St. Petersburg	1894	796,333	15¾ comp.	15¾ comp.	3	4 12-in., 6 6-in. Q.F., 12 1·8-in., 4 1·4-in., 2 M.	6	16·0	550	..
b.	Tchesmé, B.S.	I. & S.	10,180	331	0	69	0	26	6	2	11000	Sebastopol	1886	900,000	16 comp.	14 comp.	3	6 12-in. 50 ton, 7 6-in., 8 Q.F., 6 M.	7	15·0	886	325
”	Tria Sviatitelia, B.S. (Three Saints.)	S.	12,480	357	6	72	2	27	0	2	10600	Nicolaieff	1893	..	18–16	16	3	4 12-in., 12 6-in. Q.F., 4 4-in., 4 7-in., 56 smaller Q.F. & M.	6 2 sub.	16·0 18·0 (t)	1000	562
b.	Tsarevitch	S.	13,110	388	8	75	5	26	*0	2	16300 B	La Seyne	Bldg.	..	9 K. S.	10·5 K. S.	3	4 12-in., 12 6-in. Q.F., 20 3-in., 2 2·5-in., 20 1·8-in., 6 1·4-in.	..	18·0	1016 / 2000	..
circular c.d.s.	Vice-Admiral Popoff, B.S.	I. shd.	3590	120	0	120	0	13	5	6	3066	Nicolaieff	1875	..	16	16	..	2 12-in. 40-ton, 2 Q.F., 6 l.	..	8·0	250	458
a.c.	Vladimir Monomach	S. shd.	6061	296	6	52	0	24	0	2	7000	St. Petersburg	1882	..	6 comp.	..	2	5 8-in., 12 6-in., 18 Q.F. & M., 4 l.	2	15·2	400	550
b.	Unnamed C	S.	12,700	374	0	72	2	25	*0	2	16000 Nic.	St. Petersburg (New Admiralty)	Pro.	..	9 K. S.	10·5 K. S.	3	4 12-in., 12 6-in. Q.F., 20 3-in., 20 3-pr., 6 1-pr.	..	18·0	1016 / 2000	..
b.	” D											St. Petersburg (Russ. Loco. Co.)										
b.	” E											Nicolaieff										
b.	” F											St. Petersburg										

* Mean draught. † And liquid fuel.

Ten old Monitors of 1566 tons have been removed from this list:—Uragan, Tifon, Streletz, Edinorog, Koldun, Lava, Bronenosetz, Latnik, Perun, and Vieschun; and one of 1461 tons—Smerch.

NOTE.—It is by no means certain that the new shipbuilding programme will be carried out in its entirety, or that the projected ships will be as given in this list.—ED.

RUSSIA.—Cruising Ships, &c.

(B.S., Black Sea Fleet.)

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£		ins.			knots.	tons.	
to.g.b.	Abrek	S.	535	212 2	24 10	9 0	2	4506 (*t.*)	Abo	1896	53,600	..	½	.. ..	2	21·2 (*t.*)	..	..
2nd cl. *cr.*	Admiral Korniloff	S.& W.	5000	351 0	48 6	20 0	2	9000	St. Nazaire	1887 1895	296,000	..	2½	2 8-in., 14 6-in., 6 1·8-in. Q.F., 6 1·4-in., 5 l.	6	17·5	1100	425
cr.	Afrika	I.	2590	285 5	39 4	17 1	1	1350	Chester, U.S.	1877	..	..	..	3 6-in., 6 Q.F., 4 M., 4 l.	..	13·0	975	257
cr.	Asia	I.	2500	269 0	36 0	16 5	1	1100	Philadelphia	1878	..	..	..	2 6-in., 5 Q.F., 6 M., 5 l.	..	13·0	750	260
cr.	Askold	S.	6000	426 6	49 3	20 4	..	19000	Kiel (Germania)	Bldg.	..	..	..	12 6-in. Q.F., 12 3-in., 6 1·4 M.	6 (2sub.)	23·0	710	570
cr.	Aurora	S.	6630	413 4	55 9	21 0	3	11610 B	St. Petersburg	B dg.	..	..	2½	6 5·9-in. Q.F., 6 4·7-in., 27 smaller.	4	20·0	..	..
to.g.b.	Bakan	S. shd.	840	180 6	15 7	11 6	2	3800 B	St. Petersburg (Baltic)	1896	..	..	..	.. ..	..	..	..	..
g.v.	Bobr	S.	950	187 0	35 2	9 6	2	1150	Kretona	1884	43,000	..	..	1 9-in., 1 6-in., 5 Q.F., M., & 6 l.	..	12·0	..	..
cr.	Bogatyr	S.	6500	413 5	54 5	20 8	2	19500 Nor.	Stettin (Vulcan)	Bldg.	..	5 N.S.	2¾	12 6-in. Q.F., 12 3-in., 6 1·4 Hotchkiss.	6 (2sub.)	23 0	720 / 1000	580
to.g.b.	Captain Sacken, B.S.	S.	742	210 0	24 0	8 10	2	3400	Nicolaieff	1888	40,700	..	..	7 4·7-in. Q.F., 7 M.	6	18·5	97	120
g.v.	Chernomoretz, B.S.	S.	1224	210 0	35 0	11 1	1	2000	Nicolaieff	1889	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·5	250	161
,,	Coreetz	S.	1213	206 0	35 0	10 6	2	1500	Stockholm	1886	..	..	1½	2 8-in., 1 6-in., 2 Q.F., 4 l.	2	13·5	..	..
cr.	Diana	S.	6630	413 4	55 9	21 0	3	11610 B	St. Petersburg (New Admiralty)	Bldg.	..	..	2½	6 5·9-in. Q.F., 6 4·7-in., 27 smaller.	4	20·0	..	..
corv.	Djigit	I. & W.	1456	206 9	32 10	16 1	1	1700	St. Petersburg	1876	..	..	..	3 6-in., 8 Q.F. & M., & 4 l.	..	13·0	250	172

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	..	..	..	[illegible]	3	22·0	90	87
g.v.	**Gilyak**	S.	963	200	0	37	0	..	..	..	1000 B	St. Petersburg (New Admiralty)	1897	..	..	..	1 4·7-in. Q.F., 5 3-in., 2 2·6-in., 4 1·8-in.	2	12·0	..	..
to.g.b.	**Griden,** B.S.	S.	400	192	6	24	2	7	6	2	3500	Nicolaieff	1893	66,600	..	..	2 1·8-in. Q.F., 7 1·4-in., 10 M.	3	22·0	90	60
g.v.	**Jermak**	I.	706	154	3	26	3	11	2	1	125	St. Petersburg	1870	..	..	..	2 guns	..	..	..	..
to.g.b.	**Kazarsky,** B.S.	S.	400	190	0	24	0	8	6	2	3500	Elbing	1890	32,500	..	..	9 1·8-in. Q.F. (Hotchkiss)	2	23·0	90	60
corv.	**Kreisser**	I. & W.	1653	206	9	32	10	16	1	1	1800	St. Petersburg	1875	..	..	..	2 6-in., 7 Q.F., 1 M., 4 l.	..	13·0	..	..
g.v.	**Kubanetz,** B.S.	S.	1224	210	0	35	0	11	0	1	1500 B	Sebastopol	1888	40,000	..	..	2 8-in., 1 6-in., 7 Q.F.	2	13·8	250	161
to.g.b.	**Lieutenant Ilyin**	S.	714	230	0	24	0	8	10	2	3500	St. Petersburg	1887	40,150	..	..	7 3-pr. Q.F., 10 M.	7	20·1	97	120
g.v.	**Mandjur**	S.	1416	210	0	35	0	11	0	2	1400	Copenhagen	1886	..	..	1½	2 8-in., 1 6-in., 7 Q.F., M., & 4 l.	2	14·0	..	..
corv.	**Nayezdnik**	I. & W.	1334	206	9	32	10	14	0	1	1719	St. Petersburg	1878	..	..	..	3 6-in., 7 Q.F. & M., 4 l.	..	13·0	250	172
cr.	**Novik***	S.	3000	347	10	40	0	..		3	..	Elbing	Bldg.	..	..	2	..	..	25·0	..	..
corv.	**Oprichnik**	S. & W.	1426	206	9	32	10	14	0	1	1268	St. Petersburg	1880	..	..	..	3 6-in., 7 Q.F. & M., 4 l.	..	13·0	230	172
cr.	**Pallada**	S.	6630	413	4	55	8	21	0	3	11610 B	St. Petersburg (New Admiralty)	Bldg.	..	..	2½	6 5·9-in. Q.F., 6 4·7-in., 27 smaller	4	20·0	..	..
3rd cl. *cr.*	**Pamyat Merkuriya,** B.S.	I. & S.	3050	295	0	41	0	17	0	1	3000	Toulon	1880	..	..	..	6 6-in., 8 Q.F. & M., 4 l.	2	16·0	1100	200
sl.	**Plastun**	I. & W.	1255	206	9	32	10	14	0	1	1268	St. Petersburg	1879	..	..	..	3 6-in., 7 Q.F. & M., & 4 l.	..	13·0	250	172
to.g.b.	**Posadnik**	S.	462	192	6	24	2	7	6	2	3600	Elbing	1892	111,000	..	..	2 1·8-in. Q.F., 7 1·4-in., 3 M.	3	22·0	90	87
corv.	**Razboynik**	I. & W.	1329	206	9	32	10	14	0	1	1786	St. Petersburg	1878	125,000	..	..	3 6-in., 7 Q.F. & M., & 4 l.	..	13·0	250	172

* The programme is said to include ten cruisers of this class: also a mining vessel (6000 tons), and a torpedo transport, the Yenisei (3000 tons).

RUSSIA.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
3rd cl. *cr.*	**Rynda**	S. shd.	3508	265 9	45 11	16 1	2	3000	St. Petersburg	1885	..	..	1½	10 6-in., 9 Q.F., M., & 4 l.	4	14·8	710	322
g.v.	**Sivootch**	S.	950	187 0	35 0	9 6	2	1125	Stockholm	1884	43,000	..	..	1 9-in., 1 6-in., 5 Q.F., M., & 6 l.	..	12·5	..	..
corv.	**Strjelok**	I. & W.	1343	206 9	32 10	14 0	1	1528	St. Petersburg	1880	..	..	..	3 6-in., 7 Q.F., M., & 4 l.	..	13·0	250	172
cr.	**Svietlana**	S.	3828	331 3	42 8	18 9	2	3828 B	Havre	1896	..	4	2	6 5·9 Q.F. (Canet), 10 1·8-in.	4	20·2 (*t.*)	1000	..
g.v.	**Teretz, B.S.**	S.	1224	210 0	35 0	11 0	..	1500 B	Sebastopol	1888	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·8	250	161
„	**Uraletz, B.S.**	S.	1224	210 0	35 0	11 0	..	1500 B	Sebastopol	1888	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·8	250	161
to.g.b.	**Voevoda**	S.	400	192 6	24 2	7 6	2	3600	Elbing	1892	111,000	..	..	2 1·8-in. Q.F., 7 1·4-in., 3 M.	3	22·0	90	87
sl.	**Vjestnik**	I. & W.	1255	206 9	32 10	14 2	1	1268	St. Petersburg	1879	..	..	..	3 6-in., 7 Q.F. & M., & 4 l.	..	13·0	250	172
to.g b.	**Vzadnik**	S.	400	192 6	24 2	7 6	2	3000	Abo	1893	..	..	..	4 1 8-in. Q.F., 7 1 4-in. 10 M. & l.	3	22·0	250	172
cr.	**Waryag**	S.	~~6500~~	420 0	52 0	20 8	2	20000 Nic.	Philadelphia	Bldg.	..	..	3	12 6-in. Q.F., 12 3-in., 6 1·4 Hotchkiss.	6 (2sub.)	23·0	770 / 1250	571
sl.	**Zabiyaka**	I.	1234	219 10	29 6	14 9	1	1194	Philadelphia	1878	..	..	..	6 Q.F., 4 M., 5 l.	..	14·5	90	87
g.v.	**Zaporojetz**	S.	1224	210 0	35 0	10 0	2	1500	Nicolaieff	1887	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·5	250	161
cr.	Unnamed, D	S.	~~6500~~	..	..	..	..	..	St. Petersburg (Russ. Loco. Co.)	Pro.	..	..	..	..	..	..	..	..
cr.	„ E	S.	~~6500~~	..	..	..	..	..	Nicolaieff	Pro.	..	..	..	..	..	..	..	..
cr.	„ F	S.	~~6500~~	..	..	..	..	..	Nicolaieff	Pro.	..	..	..	..	..	..	..	..

Baltic:—*Ten Gunboats, Staunch Class*, of 270 to 402 tons, 195 to 445 I.H.P., with 1 11-inch breech-loader, and 9 knots speed, and *two Gunboats* of about 180 tons and 7 knots speed. *Training Ships*, Bajan, Voin, Vierny, and Moriak. Ermach, very powerful ice-breaker. Black Sea:—*Twelve Steamers* (*Gun-vessels, Despatch-vessels, &c.*) 90 to [illegible] Vachts, Standart, Polarnaia Svezda, Tsarevna, &c.

Auxiliary Steamers.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Complement.
	BLACK SEA CO.		tons.	ft.	in.	ft.	in.	ft.	in.					
Auxiliary Cruiser	Czar	S.	2340	319	0	37	0	23	6	1	350 nom.	Newcastle	1883	14
,,	Czarevna	,,	2340	319	0	37	0	23	6	1	350 nom.	,,	1883	14
,,	Czaritza	,,	2340	319	0	37	0	23	6	1	350 nom.	,,	1883	14
,,	Grand Duke Alexis	,,	2350	284	0	37	0	14	9	1	3500	Hebburn	1890	16
,,	Grand Duke Constantine	,,	2400	284	0	37	0	15	0	1	3500	,,	1891	16
,,	Grand Duke No. 1	,,	2400	288	0	37	0	15	0	1	2500	,,	Bldg.	14½
,,	Grand Duke No. 2	,,	2400	288	0	37	0	15	0	1	2500	,,	,,	14½
,,	Emperor Nicolas II.	,,	..	..		..		..		..	..	,,	1895	..
,,	Roumantzeff	,,	760	212	0	28	0	7	6	2	1000	,,	1894	13
	VOLUNTEER FLEET.													
,,	Ekaterinoslav	,,	10,500	440	0	49	6	24	0	2	3200	,,	1896	12
,,	Khabarovsk	I.	2700	265	0	36	0	14	6	2	1800	,,	1894	13
,,	Kherson†	S.	10,225	493	0	54	3	24	0	2	{12,500 B 13,150 (t.)*}	,,	1895	19½
,,	Kiev	,,	10,500	440	0	49	6	24	0	2	3200	Clydebank	1895	13
,,	Kostroma	I.	7975	360	0	42	0	23	6	1	2700	Hebburn	1888	14
,,	Moskva†	S.	11,700	508	0	58	0	25	0	2	12,500 B	Clydebank	1898	20
,,	Nijni Novgorod	I.	7876	325	0	40	0	23	6	1	2000	Elswick	1891	11½
,,	Orel	,,	7990	445	0	48	0	23	6	2	10,000	Hebburn	1889	19
,,	Petersburg	,,	9252	460	0	52	0	24	0	2	11,000	,,	1894	19
,,	Poltava	S.	10,225	493	0	54	3	24	0	2	12,500	Dumbarton	Bldg.	19½
,,	Saratoff	,,	8556	462	0	50	0	24	0	2	10,000	Glasgow	1892	19
,,	Tamboff	,,	8640	385	0	45	0	24	6	1	2,500	Dumbarton	1893	12¾
,,	Vladimir	,,	10,500	440	0	49	6	24	0	2	3,200	,,	1895	12
,,	Voronej	,,	10,500	440	0	49	6	24	0	2	3,200	,,	1895	12
,,	Yaroslav	,,	8640	385	0	45	0	24	6	1	2,500	,,	1893	12¾

* Belleville boilers supplied by Maudslay. † Armament, 3 4·7-in. Q.F., 20 smaller; Belleville boilers constructed at Clydebank. Three other ships of 10,000 tons, 20 knots, in hand.

Russia

SPAIN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.			Armament.		Speed.	Normal Coal Supply.	Complement.
															Belt.	Gun Position	Deck Plating.	Guns.	Torpedo Tubes.			
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	ins.	ins.			knots.	tons.	
a.c.b.	**Almirante Oquendo***	S.	7000	340	0	65	0	21	6	2	13,000	Bilbao .	1891	600,000	12	10½	3	2 11-in., 10 5·5-in. (all Hontoria), 8 2·2-in. Q.F., 8 1·4-in., 2 M.	6	20·0	1200	500
”	**Cardenal Cisneros** .	S.	7000	347	10	61	0	21	10	2	15,000	Ferrol . .	1896	600,000	12	10½	2	2 11-in., 10 5·5-in. Q.F., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	8	20·0	1200	500
”	**Cataluña** . . .	S.	7000	347	10	61	0	21	10	2	15,000	Carthagena .	Bldg.	600,000	12	10½	2	2 11-in., 10 5·5-in. Q.F., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	8	20·0	1200	484
a.c.	**Cristobal Colon*** .	S.	6840	328	0	59	8	24	0	2	14,000 Nic.	Sestri Ponente	1896	..	6 H.S.	6 H.S.	1½	2 10-in., 10 6-in. Q.F., 6 4·7-in., 10 2·2-in., 10 1·4-in., 2 M.	4	20·0	600 1000	450
a.c.t.	**Emperador Carlos V.**	S.	9235	380	0	67	0	25	0	2	18,500	Cadiz (Vea Murguia)	1895	734,000	2	10	6⅝	2 11-in. (Hontoria), 8 5·5-in. Q.F., 4 3·9-in., 2 2·7-in., 4 2·2-in., 6 M.	6	20·0	1200	535
a.c.b.	**Infanta Maria Teresa***	S.	7000	340	0	65	0	21	6	2	13,758	Bilbao .	1890	600,000	12	10½	3	2 11-in., 10 5·5-in. (all Hontoria), 8 2·2-in. Q.F., 8 1·4-in., 2 M.	6	20·25	1200	500
br.	**Numancia** . . .	I.	7305	314	10	55	9	25	3	1	3708	La Seyne .	1863 1897	315,600	5½	5	..	8 10-in. M.L.R. (Armstrong), 6 6·2-in. Q.F., 6 4·7 in. (Hontoria), 8 M., 3 l.	2	8·0	1100	600
b.	**Pelayo** . . .	S.	9900	330	0	66	0	24	11	2	9000 Nic.	La Seyne .	1887 1897	..	17¾	19¼	4	2 12·5-in. 48-ton, 2 11-in. 38-ton, 9 5·5-in. Q.F., 6 smaller, 12 M.	7	16·0	800	600
a.c.b.	**Princesa de Asturias**	S.	7000	347	10	61	0	21	10	2	15,000	Carraca .	1896	600,000	12	10½	2	2 11-in., 10 5·5-in. Q.F., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	8	20·0	1200	500
c.s., t.	**Puig-cerda.** (Monitor) (torpedo training)	I.	553	127	11	29	6	6	7	2	328	La Seyne .	1874	..	4	4	9	1 6·2-in. (Palliser), 2 4·7-in. bronze smooth bores.	..	8·0	23	..
a.c.b.	**Vizcaya*** . . .	..	7000	340	0	65	0	21	6	2	13,000	Bilbao .	1891	600,000	12	10½	3	2 11-in., 10 5.5-in. Q.F., 2 2·7-in., 8 12·2-in., 4 1·4-in., 2 M.	6	20·0 21·0 (t)	1200	500
br.	**Vitoria** (training) † .	I.	7250	318	3	55	10	25	3	1	4500	Blackwall .	1865	..	5¼	5	..	8 9-in. M.L.R. (Armstrong), 3 8-in., 1 7·8-in. (Hontoria), 8 M., 2 l.	2	11·0	875	561

* The Infanta Maria Teresa, Almirante Oquendo and Vizcaya were sunk in the battle of Santiago, July 3, 1898, and the Cristobal Colon was run ashore to save her from capture. The Maria Teresa was afterwards refloated by the Americans, but was wrecked on the passage to the United States.

† Lately furnished with fighting-masts and 5·5-in. Q.F. guns at La Seyne.

SPAIN.—Cruising Ships.

Class.	NAME.	Material.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
															Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			metric tons	ft.	in.	ft.	in.	ft.	in.	no.				£		ins.			knots.	tons.	
cr.	Alfonso XII.	S.	3090	278	10	42	7	16	5	1	4800	Ferrol	1887	..	..	..	6 6·2-in. (Hontoria), 2 2·7-in. 6 6-pr. Q.F., 4 3-pr., 5 M.	5	17·5	600	300
cr.	Alfonso XIII.	S.	5000	318	6	50	6	20	0	2	11,000	Ferrol	1891	..	..	4½	4 7·8-in. (Hontoria), 6 4·7-in., 6 2·2-in. Q.F., 6 1·4-in., 3 M.	5	20·0	1200	276
cr.	Aragon	W.	3342	246	0	45	11	20	11	1	4400	Carthagena	1879	..	..	..	6 6·2-in. (Hontoria), 2 3·3-in. (Krupp), 4 2·9-in., 2 M.	2	14·0	470	300
cr.	Castilla*	W.	3342	246	0	45	11	20	11	1	4400	Cadiz	1881	..	..	..	4 5·9-in. (Krupp), 2 4·7-in., 2 3·3-in., 4 2·9-in., 8 Q.F., 2 M.	2	14·0	470	300
g.b.	General Concha	I.	524	157	5	25	7	8	7	2	600	Ferrol	1883	..	..	..	3 4·7-in. (Hontoria), 2 Q.F., 1 M.	1	11·5	80	93
cr.	Conde de Venadito	I.	1130	210	0	32	0	12	6	1	1600	Carthagena	1888	..	..	..	4 4·7-in. (Hontoria), 2 2·7-in., 2 Q.F., 5 M.	2	14·0	220	130
to.g.b.	Don Alvaro de Bazan	S.	823	233	0	26	9	22	0	2	4600	Ferrol	1897	..	..	..	2 4·7-in. (Hontoria) Q.F., 4 1·6-in., 2 M.	4	20 0	..	110
cr.	Don Antonio de Ulloa*	I.	1130	210	0	32	0	12	6	1	1600	Cadiz	1887	..	..	..	4 4·7-in. (Hontoria), 2 2·7-in., 2 Q.F., 5 M.	2	14·0	210	130
to. g. b.	Doña Maria de Molina	S.	823	233	0	26	9	22	0	2	4600	Ferrol	1896	..	..	..	2 4·7-in. (Hontoria), Q.F., 4 1·6-in., 2 M.	4	20·0	..	110
to.g.b.	Destructor	S.	458	192	6	25	0	7	0	2	3800	Clydebank	1887	..	..	..	1 3·5-in., 4 6-pr. Q.F., 4 M.	3	22·56	104	55
g b.	Elcano*	I.	524	157	5	25	7	8	6	2	600	Carraca	1885	..	..	..	3 4·7-in. (Hontoria), 2 Q.F., 2 M.	1	11·5	80	116

* Destroyed with others in the battle of Manila, May 1st, 1898. The Isla de Cuba, Isla de Luzon, and Don Juan de Austria were refloated and repaired, and added to the United States Navy, in the Tables of which they are included.

SPAIN.—Cruising Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
															Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	ins.	ins.			knots.	tons.	
d.v.	Fernando el Catolico (Torpedo training)	I.	500	157	5	25	7	8	5	2	550	La Seyne	1875	..	..	..	1 6·2-in. M.L.R. (Palliser), 2 4·7-in., smooth-bores, 1 M.	..	10·0	20	98
to.g.b.	Filipinas	S.	750	213	0	27	0	8	6	2	4600	Cadiz	1892	..	..	..	2 4·7-in. Q.F., 4 1·5-in., 4 M.	4 sub.	20·0	120	110
to.g.b.	Galicia	S.	571	190	0	23	0	10	4	2	2600	Le Graña	1891	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	19·0	106	80
g. v.	General Lezo†	I.	524	157	5	25	7	8	6	2	600	Carthagena	1885	..	..	..	2 4·7-in. (Hontoria), 1 3·5-in., 2 Q.F., 1 M.	2	11·0	80	97
cr.	Infanta Isabel	I.	1130	210	11	32	2	12	5	1	1500	Cadiz	1885	..	..	..	4 4·7-in. (Hontoria), 2 2·7-in., 3 Q.F., 4 M.	2	14·0	220	130
cr.	Isabel II.	I.	1130	210	11	32	2	12	5	1	1500	Ferrol	1886	..	..	..	4 4·7-in. (Hontoria), 2 7·7-in., 4 Q.F., 3 M.	2	14·0	220	130
cr.	Isabel la Catolica	S.	3500	..		..		..		..	..	Carraca	Bldg.	..	..	..	.. .. ..	..	..	..	..
sl.	Jorge Juan*	W.	935	203	5	29	6	12	2	1	1100	La Seyne	1876	..	..	..	3 4·7-in. (Hontoria), 2 2·8-in. (Krupp), 2 M.	..	13·0	130	146
cr.	Lepanto	S.	4826	318	6	50	6	20	0	2	12,000	Carthagena	1892	..	..	4¾	4 7·8-in. (Hontoria), 6 4·7-in. Q.F., 6 6-pr., 4 3-pr. 5 M.	5	20·0	1100	276
g.v.	Magellanes	I.	524	157	5	25	7	8	6	2	600	Cadiz	1885	..	..	..	3 4·7-in. (Hontoria), 3 M.	1	11·0	80	97
to.g.b.	Marques de la Victoria	S.	823	233	0	26	9	22	0	2	4600	Ferrol	1897	..	..	..	2 4·7-in. (Hontoria) Q.F., 4 1·6-in., 2 M.	4	20·0	..	110

cr.	Marques de la Ensenada	S.	1030	185	0	30	0	11	6	2	1600	Carraca	1890	..	..	2¼	4 4·7-in. (Hontoria), 5 Q.F., 4 M.	4	15·0	160	164
d.v.	Marques del Duero†	I.	500	157	5	25	7	8	5	2	550	La Seyno	1875	..	..	..	1 6·2-in. M.L.R. (Palliser), 2 4·7-in. smooth-bores, 1 M.	..	10·0	90	98
to.g.b.	Marques de Molins	S.	571	190	0	23	0	10	4	2	2600	La Graña	1891	..	..	..	2 4·7in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	19·0	106	80
„	Martin Alonzo Pinzon	S.	571	190	0	23	0	10	4	2	2600	La Graña	1892	..							
cr.	Navarra	W.	3342	232	11	42	7	20	4	1	4400 Nic.	Ferrol	1881	..	..	..	4 5·9-in., 2 4·7-in., 2 3·4-in., 4 2·9-in., 4 M.	2	14·0	470	300
„	Nueva Espana	S.	630	190	0	23	0	11	9	2	2600	Carraca	1889	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F.,	2	18·0	106	91
„	Quiros	S.	315	155	0	23	0	11	0	..	500	Hong Kong	1895	..	..	..	2 2·2-in. Q.F., 2 M. 1 M.	..	11·5	..	..
to.g.b.	Rapido	S.	570	190	0	23	0	10	4	2	2600	Carraca	1891	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	18·0	106	80
cr.	Reina Christina†	S.	3520	282	2	42	7	16	5	1	3970	Ferrol	1886	..	..	..	6 6·2-in. (Hontoria), 2 2·7-in., 3 2·2-in. Q.F., 2 1·5-in., 6 3-pr., 2 M.	5	17·5	600	370
„	Reina Regente	S.	5000	..	..		..		..	..	..	Ferrol	Bldg.	..	..	..	..	..	20·0	..	..
„	Reina Mercedes‡	S.	3090	278	10	42	7	16	5	1	3700	Carthagena	1887	..	..	..	6 6·2-in. (Hontoria), 2 2·7-in., 3 2·2-in. Q.F., 2 1·5.in., 6 1·4-in., 2 M.	5	17·5	600	375
„	Rio de la Plata	S. shd.	1800	246	0	35	4	15	0	2	7100	Havre	1898	..	..	1	2 5·5-in. Q.F., 4 3·9-in., 4 2·2-in., 6 M.	2	20·0	270	..
to.g.b.	Temerario	S.	570	190	0	23	0	10	4	2	2600	..	1889	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	20·5	106	82
cr.	Velasco†	I.	1152	209	11	29	3	12	5	1	1500	Blackwall	1881	..	..	..	3 5·9-in. 4-ton (Armstrong), 2 2·7-in. (Hontoria), 2 M.	..	14·3	220	173
to.g.b.	Veloz	S.	750	213	0	27	0	8	6	2	4500	..	Bldg.	..	..	..	2 5·9-in. (Hontoria), 4 2·2-in. Q.F., 4 M.	2	20·0	106	..
„	Vincente Yanez Pinzon	S.	571	190	0	23	0	10	4	2	2600	La Graña	1891	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	19·0	106	80
„	Villalobos	S.	315	155	0	23	0	11	0	..	500	Hong Kong	1896	..	..	..	2 2·2-in. Q.F., 2 M.	..	11·5	..	..

* Sunk in Nipe Bay, N.E., Cuba, July 21, 1898. † Destroyed in the battle of Manila, May 1st, 1898. ‡ Sunk at the mouth of Santiago Harbour, July 5th, 1898; since refloated by the Americans.
In the war with the United States a number of Spanish gunboats, including nearly all of the first class, were captured (see the United States Tables), while many were destroyed. The number and situation of those yet left to Spain cannot at present be stated.

SWEDEN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Backing. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
a.g.b.	Berserk	I.	452	131	3	29	6	8	3	2	155	Norköping	1874	..	2½	14	¾	1 4·7-in. Q.F., 2 2·2-in.	..	8·0	19	45
”	Björn	I.	457	131	3	26	3	8	3	2	155	Norköping	1874	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
c.d.s., t.	Dristigheten	S.	3450	285	6	49	3	16	1	2	5000 W. T.	..	Bldg.	..	7¾ N.S.	7¾ N.S.	1¾	2 8·2-in., 6 5·9-in. Q.F., 10 2·2-in., 2 M.	2 sub.	16·0	..	..
”	Fenris	I.	259	104	11	22	4	7	10	1	44	Stockholm	1872	..	2	11	¾	1 9·4-in., 2 M.	..	6·0	7	30
”	Folke	I.	460	131	3	26	3	8	3	2	155	Norköping	1875	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
”	Gerda	I.	457	131	3	26	3	8	3	2	133	Stockholm	1873	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
c.d.s., t.	Göta	S.	3135	258	6	48	0	16	0	2	4677	Gothenburg	1890	..	11½	11½–9¾	2	2 10-in., 4 6-in., 5 Q.F., 6 M.	3	15·96	200	150
a.g.b.	Hildur	I.	457	131	3	26	3	8	3	2	133	Stockholm	1872	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
c.d.s., t.	John Ericsson	I.	1500	200	2	45	11	11	6	1	380	Norköping	1865	..	4½	11½	1	2 5·9-in., 2 2·4 in. Q.F., 2 M.	..	7·0	112	80
”	Loke	I.	1600	205	3	45	11	11	10	1	430	Norköping	1871	..	4½	18	1	2 9·4-in., 2 M.	..	7·0	112	75
”	Njord	S.	3300	270	4	47	10	16	6	2	3700	Gothenburg	1898	..	9·5	..	..	2 9·8-in., 6 4·7-in. Q.F., 10 2·2-in., 4 M.	1	16·0	300	200
”	Odin	S.	3300	270	4	47	10	16	6	2	3700	Stockholm	1896	..	9·5	..	.. 2	2 9·8-in., 6 4·7-in. Q.F., 10 2·2-in., 4 M.	1	16·0	300	200
a.g.b.	Sköld	I.	247	104	11	22	4	8	3	1	17	Stockholm	1869	..	1	9	¾	1 9·4-in., 2 M.	..	4·0	5	39
”	Sölve	I.	454	131	3	29	6	8	3	2	155	Norköping	1875	..	2½	14	¾	1 9·4-in., 2 M.	..	8·0	19	45
c.d.s., t.	Svea	S.	2900	249	4	49	3	15	9	2	3100	Gothenburg	1886	127,300	11½	11½	2	2 10-in. (Armstrong), 4 6-in., 4 l., 6 M.	3	15·45	200	268
”	Thor	S.	3300	270	4	47	10	16	6	2	3700	Stockholm	1898	..	9·5	..	..	2 9·8-in., 6 4·7-in. Q.F., 10 2·2-in., 4 M.	1	16·0	300	200
t.	Thordön	I.	1500	200	2	45	11	11	6	1	380	Norköping	1866	..	4½	11½	1	2 9·4-in., 2 M.	..	6·0	112	80
c.d.s., t.	Thule	S.	3150	249	4	49	3	15	9	2	4750	Stockholm	1892	..	11½–7¾	11½	2	2 10-in. (Armstrong), 4 6-in., 5 l., 6 M.	3	16·0	..	165
”	Tirfing	I.	1500	200	2	45	11	11	6	1	380	Norköping	1867	..	4½	11½	1	2 9·4-in., 2 M.	..	6·0	112	80
a.g.b.	Ulf	I.	457	131	3	26	3	8	3	2	155	Norköping	1873	18,000	2½	14	¾	1 4·7-in. Q.F., 2 2·2-in.	..	8·0	20	45

Three armourclads of the Dristigheten class projected.

SWEDEN.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
															Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.									knots.	tons.	
corv.	**Balder**	W.	1886	203	5	36	0	18	4	1	1380	Carlskrona	1870	..	..	..	2 6-in. (Armstrong), 6 4·7-in., 2 l., 4 M.	..	12·0	200	218
g.v.	**Blenda**	I.	500	167	4	25	11	9	2	2	590	Gothenburg	1875	..	..	..	1 10·6-in., 1 4·7-in., 2 M.	..	12·0	98	71
to.g.b. *to.g.b.*	**Claes Horn** **Claes Uggla**	S.	670	223	0	27	6	8	9	2	4000	Elbing	1898 Bldg.	..	..	..	2 4·7-in. Q.F., 4 2·2-in.	1 (sub.)	20·0	..	..
g.v.	**Disa**	I.	500	167	4	25	11	9	2	2	590	Carlskrona	1877	..	..	..	1 6-in., 1 4·7-in., 2 l., 2 M.	..	12·0	98	72
tor. ship.	**Drott** (ex Ran)	I.	630	173	10	26	3	9	6	2	960	Stockholm	1877	..	..	..	4 Engström, Q.F.	3	13·0	100	..
g.v.	**Edda**	I.	640	180	5	27	3	9	6	2	960	Carlskrona	1882	..	..	..	1 10·6-in., 1 6-in., 2 l., 2 M.	..	13·0	80	76
corv.	**Freja**	S.& W.	2000	216	6	39	4	18	9	1	1750	Malmö	1885	..	..	..	5 6-in., 8 5-in., 4 l., 4 l.	..	12·0	180	250
to.g.b. „ „	**Jacob Bagge** **Örnen** **Psilander**	S.	670	223	0	27	6	8	9	2	4000	Poplar Elbing Poplar	1898 1896 Bldg.	..	..	..	2 4·7-in. Q.F., 4 2·2-in.	1 (sub.)	20·0	..	..
g.v.	**Rota**	I.	537	170	7	26	3	9	2	2	780	Stockholm	1878	..	..	..	1 10·6-in., 1 4·7-in., 2 M.	..	13·0	80	72
corv.	**Saga**	W.	1535	200	2	32	10	17	1	1	900	Carlskrona	1878	..	..	..	1 6-in. (Armstrong), 6 4·7-in., 4 M., 2 l.	..	11·0	170	189
g.v.	**Skäggald**	I.	537	170	7	26	3	9	2	2	780	Stockholm	1879	..	..	..	1 6-in., 1 5-in., 2 M.	..	13·0	80	72
„	**Skagul**	I.	537	170	7	26	3	9	2	2	780	Stockholm	1878	..	..	..	1 6-in., 1 5-in., 2 M.	..	13·0	80	72
„	**Skuld**	I.	537	170	7	26	3	9	2	2	780	Carlskrona	1880	..	..	..	1 6-in., 1 5-in., 2 M.	..	13·0	80	72
„	**Urd**	I.	537	170	7	26	3	9	2	2	780	Malmö	1877	..	..	..	1 6-in., 1 5-in., 2 Q.F., 2 M.	..	13·0	80	71
„	**Verdande**	I.	537	170	7	26	3	9	2	2	780	Carlskrona	1879	..	..	..	1 6-in., 1 5-in., 2 M.	..	13·0	80	72

Four gunboats of 190 to 200 tons, and about 130 I.H.P. each, and carrying 1 5-in B.L.R. and 2 M.; also one vessel of 280 tons and 440 H.P., armed with 4 quick-firing guns —the Svenskund, used as a mining and torpedo-ship and ice-breaker.

TURKEY.—Armoured Ships.

A number of ships have been struck out of these lists owing to information obtained from Constantinople. Of the remainder few have any fighting value.

Class.	NAME.	Material.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.	inches.			knots.	tons.	
c.b.	Assar-i-Shefket .	I.	2080	203 5	42 7	16 5	2	1750	La Seyne .	1868	..	6	5	..	1 9-in. (Armstrong), 4 7-in., 4 M., 4 l. ..	..	11·0	300	220
c.b.	Assar-i-Tewfik .	I.	4687	272 4	52 6	24 11	1	3560	La Seyne .	1868	..	8	6	..	2 9·2-in., 6 6-in. Q.F., 10 12-pr., 12 6-pr.*	..	13·0	400	..
c.	Avni-Illah . .	I.	2400	226 4	36 0	16 5	1	2200	Thames .	1869	..	6	6	1½	4 9-in. M.L.R. (Armstrong), 4 M., 4 l. .	1	12·0	220	225
b.	Azizieh (a) . .	I.	6400	292 0	55 9	25 7	1	3735	Clyde .	1864	..	5½	4½	..	2 9·2-in. (Krupp), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	13·0	750	600
c.b.	Feth-i-Bulend .	I.	2806	236 3	39 4	18 1	1	3250	Thames .	1869	..	9	9	5	4 9-in. M.L.R. (Armstrong), 4 M., 4 l. .	1	13·0	300	250
a.g.b.	Feth-el-Islam .	I.	335	101 9	24 7	5 11	1	290	Gironde .	1864	..	3	3	..	2 7-in. (Armstrong), 2 l. . . .	..	8·0	20	..
c.b.	Hamidieh . .	I.	6700	292 0	55 9	24 10	1	4500	Turkey	1885	..	9	5	3	10 10·2-in. (Krupp), 2 6·6-in., 6 l., 2 M.	2	13·0	600	..
b.	Mahmoudieh .	I.	6400	292 0	55 9	25 7	1	3735	Thames .	1864	..	5½	4½	..	2 9·2-in. (Krupp), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	12·0	750	600
c.b.	Messoudieh . .	I.	9120	331 5	59 0	25 11	1	7431	Thames .	1874	..	12	9	1	2 9·2-in., 12 6-in. Q.F., 16 12-pr., 10 6-pr.*	..	13·0	600	..
,,	Muin-i-Zaffer .	I.	2400	230 0	36 0	16 5	2	2200	Thames .	1869	..	6	6	1½	4 10-in. M.L.R.* (Armstrong), 1 4·7-in. (Krupp), 4 M., 4 l.	1	12·0	220	..
,,	Mukadim-i-Hair .	I.	2806	236 3	39 4	18 1	1	3000	Turkey .	1872	..	9	9	5	4 10-in. M.L.R. (Armstrong), 1 4·7-in. (Krupp), 4 M., 4 l.	1	12·0	300	250
,,	Nedjim-i-Schefhet	I.	2050	203 5	42 7	16 5	2	1900	La Seyne .	1868	..	6	5	..	1 9-in., 4 7-in. (Armstrong), 4 M., 4 l. .	1	11·0	300	220
b.	Orkanieh . .	I.	6400	292 0	55 9	25 7	1	3735	Clyde .	1865	..	5½	4½	..	2 9·2-in. (Krupp), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	12·0	750	600
,,	Osmanieh (a) .	I.	6400	292 0	55 9	25 7	1	3735	Clyde .	1864	..	5½	4½	..	2 9·2-in. (Krupp), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	12·0	750	600

(a) These ships are cut down forward and aft, and a barbette fitted at each end.

* The Assar-i-Tewfik and Messoudieh are now refitting at Genoa, and are to receive the new armament given as well as new armour and boilers.

TURKEY.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Cost.	Date of Launch.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.				£		in.	in.			knots.	tons.	
cr.	Fesibahri	S.	1815	226	0	35	0	14	0	2	2500	Turkey	..	Bldg.	..	½	6 6-in. (Krupp)	7	17·0	..	..
„	Heibetnuma	S. & W.	1960	226	0	37	0	14	0	1	2500 ind.	Turkey	..	1890	..	..	3 6·6-in. (Krupp), 6 4·7-in., 6 Q.F.	2	14·0	..	..
„	Hundavendikiar	S.	4050	279	0	49	3	21	0	2	..	Turkey	..	Bldg.	..	2	2 8·9-in. (Krupp), 6 5·9-in., 4 3·9-in.	5	..	..	300
g.v.	Lutfi-hamayoun	C.	1313	210	0	35	0	14	0	1	2800	Turkey	..	1892	..	..	4 6-in. (Krupp), 6 4·7-in. 6 Q.F.	2	13·0	..	..
to. g.b.	Namet	S.	900	230	0	31	0	16	6	2	4500	Gaarden	..	1890	½	..	2 4-in. (Krupp), 16 M.	2	19·0	..	111
„	Pelenk-i-deria	S.	810	236	3	31	0	16	6	2	5000	Gaarden	..	1890	½	..	2 4-in. (Krupp), 16 M.	2	20·0	..	111
g.v.	Sedul Bahr	W.	800	173	6	26	7	11	6	1	160	Turkey	..	1894	..	2	4 4·7-in. (Krupp), 6 M.	2	12·7	120	..
cr.	Selimieh	S.	4050	279	0	49	3	21	0	2	..	Turkey	..	Bldg.	..	½	2 8·2-in. (Krupp), 6 5·9-in., 4-in., 6 M.	..	..	..	300
„	Shadie	S.	1815	226	0	35	0	14	0	2	2500	Turkey	..	Bldg.	..	..	6 5·9-in. (Krupp)	7	17·0	..	..
to. g.b.	Shahani-deria	S.	450	200	0	23	0	9	0	2	3000	Turkey	..	1892	..	..	2 4·7-in. Q.F. (Krupp), 6 M.	4	22·0	..	..
„	New vessel (Y)	S.	900	230	0	31	0	16	6	2	4500	Gaarden	..	Bldg.	½	..	2 4-in. (Krupp), 6 M.	2	19·0	..	..
g.v.	Zuhaf	W.	800	173	6	26	7	11	6	1	160	Turkey	..	1894	..	..	4 4·7-in. (Krupp), 6 M.	2	12·7	120	..

UNITED STATES.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal *Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
c.d.s., t. (1 t.)	Ajax	I.	2100	225	0	43	8	13	6	1	340	Pittsburg	1864	141,083	5	10	..	2 15-in. smooth-bores	..	6·0	160	105
t.	Alabama	S.	11,525	368	0	72	3	25	6	2	10,000	Philadelphia	1898	544,539	9½–16½	10–15	2¾–4	4 13-in., 14 6-in. Q.F., 16 6-pr., 6 1-pr., 4 M., 2 l.	4	16·0	800 / 1200	489
c.d.s., t. (2 t.)	Amphitrite	I.	3990	259	6	55	6	14	8	2	1600	Wilmington	1883	..	5–9	7½–11½	1¾	4 10-in., 2 4-in. Q.F., 2 6-pr., 2 3-pr., 6 1-pr., 1 M., 1 l.	..	10·5	250	182
c.d.s., t. (1 t.)	Arkansas	S.	3000	252	0	50	0	12	6	2	2400	Newport News	Bldg.	197,267	11	10–11	1½	2 12-in, 4 4-in. Q.F., 3 6-pr., 4 1-pr.	..	11·5	200 / 400	131
a. c.	Brooklyn	S.	9215	400	6	64	8	26	2	2	18,769	Philadelphia	1895	613,583	3	5½–8	6–3	8 8-in., 12 5-in. Q.F., 12 6-pr., 4 1-pr., 4 M., 2 l.	4	21·9	900 / 1461	516
c.d.s., t. (1 t.)	Canonicus	I.	2100	225	0	43	8	13	9	1	340	Boston	1864	128,011	5	10	..	2 15-in. smooth-bores, 2 12-pr. H.	..	6·0	160	106
c.d.s., t. (1 t.)	Catskill	I.	1875	200	0	46	0	11	6	1	340	Brooklyn	1863	87,900	5	11	..	2 15-in. smooth-bores	..	6·0	150	105
c.d.s., t. (1 t.)	Comanche	I.	1875	200	0	46	0	11	6	1	340	Jersey City	1863	125,997	5	11	..	2 15-in. smooth-bores	..	6·0	160	105
c.d.s., t. (1 t.)	Connecticut	S.	3000	252	0	50	0	12	6	2	2,400	Bath, Me.	Bldg.	197,714	11	10–11	1½	2 12-in., 4 4-in. Q.F., 3 6-pr., 4 1-pr.	..	11·5	200 / 400	131
c.d.s., t. (1 t.)	Florida											Elizabeth Port	Bldg.	190,075								
t.	Illinois	S.	11,525	368	0	72	3	25	0	2	10,000	Newport News	1898	533,237	9½–16½	10–15	2¾–4	4 13-in., 14 6-in. Q.F., 16 6-pr., 6 1-pr., 4 M., 2 l.	4	16·0	800 / 1200	489
b.	Indiana	S.	10,288	348	0	69	3	27	2	2	9,738	Philadelphia	1893	620,569	18	6–17	2¾	4 13-in., 8 8-in., 4 6-in. Q.F., 20 6-pr. Q.F., 7 1-pr., 2 l.	2	15·5	400 / 1597	473

b.	Iowa	S.	11,340	360	0	72	3	26	10	2	12,105	Philadelphia	1896	618,514	5–14 H. S.	6–15	2¾	4 12-in., 8 8-in., 6 4-in. Q.F., 20 6-pr., 4 1-pr., 4 M., 2 l.	4	17·1 (*t*)	625 / 1795	505
c.d.s., t. (1 t.)	Jason	I.	1875	200	0	46	0	11	6	1	340	Chester	1864	86,872	5	11	..	2 15-in. smooth-bores, 2 12-pr. H.	..	6·0	150	105
ram	Katahdin	S.	2155	250	9	43	5	16	0	2	5,068	Bath, Me.	1893	191,102	3–6	18	2–6	4 6-pr.	..	16·1	175 / 192	97
super-posed turrets	Kearsarge, Kentucky	S.	11,525	368	0	72	2	25	1	2	10,000	Newport News.	1898	462,345 each	9½–16½ N. S.	9–17 N. S.	2¾–5 N. S.	4 13-in., 4 8-in., 14 5-in. Q.F., 20 6-pr., 6 1-pr., 4 M., 2 l.	4	16·0	410 / 1645	511
c.d s., t. (1 t.)	Lehigh	I.	1875	200	0	46	0	11	6	1	340	Chester	1864	86,864	5	11	..	2 15-in. smooth-bores, 2 12-pr. H.	..	6·0	150	105
c.d.s., t. (1 t.)	Mahopac	I.	2100	225	0	43	8	13	6	1	340	Jersey City	1865	130,560	5	10	..	2 15-in. smooth-bores, 2 12-pr. H.	..	6·0	160	105
t.	Maine	S.	12,500	388	0	72	2	25	6	2	16,000 (Nic.)	Philadelphia	Bldg.	592,828	8½–12 K.	9–12 K.	2¾–4	4 12-in., 16 6-in. Q.F., 20 6-pr., 6 1-pr., 4 M., 1 l.	2 sub.	18·0	1000 / 2000	515
c. d. s., t. (1 t.)	Manhattan	I.	2100	225	0	43	8	13	6	1	340	Jersey City	1865	129,247	5	10	..	2 15-in. smooth-bores, 2 12-pr. H.	..	6·0	160	105
b.	Massachusetts	S.	10,288	348	0	69	3	27	2	2	10,403	Philadelphia	1893	620,569	18	6–17	2¾	4 13-in., 8 8-in., 4 6-in., 20 6-pr., 6 1-pr., 2 M., 2 l.	3	16·2	400 / 1597	473
c.d.s., t. (2 t.)	Miantonomoh	I.	3990	259	6	55	6	15	0	2	1,426	Chester	1876 reblt.	..	7	11½	1¾	4 10-in., 2 6-pr. Q.F., 2 3-pr., 6 1-pr., 2 M., 1 l.	..	10·5	250	149
t.	Missouri	S.	12,500	388	0	72	3	25	6	2	16,000 W. T.	Newport News	Bldg.	592,828	8½–12 K.	9–12 K.	2¾–4	4 12-in., 16 6-in. Q.F., 20 6-pr., 6 1-pr., 4 M., 1 l.	2 sub.	18·0	1000 / 2000	515
c.d.s., t. (2 t.)	Monadnock	I.	3990	259	6	55	6	14	7	2	3,000	Vallejo, Cal.	1883 reblt.	..	5–9	7½–11½	1¾	4 10-in., 2 4-in. Q.F., 2 6-pr., 2 3-pr., 2 1·4-in., 2 1-pr., 2 M., 1 l.	..	12·0	250	183
c.d.s., t. (1 t.)	Montauk	I.	1875	200	0	46	0	11	6	1	340	Brooklyn	1864	86,903	5	11	..	2 15-in. smooth-bores, 2 12-pr. H.	..	5·5	160	105
c.d.s., t.	Monterey	S.	4084	256	0	59	0	15	4	2	5244	S. Francisco.	1891	345,731	6–13	7½–13	3	2 12-in., 2 10-in., 6 6-pr., 4 1-pr., 2 M., 1 l.	..	13·6	200 / 236	195

* The figures below the line in this column are bunker capacity.

UNITED STATES.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.	in.			knots.	tons.	
c.d.s.,t. (1 t.)	**Nahant**	I.	1875	200	0	46	0	11	6	1	340	Boston	1863	84,910	5	11	..	2 15-in. smooth-bores, 2 12-pr. H.	..	6·0	160	105
c.d.s.,t. (1 t.)	**Nantucket**	I.	1875	200	0	46	0	11	6	1	340	Boston	1863	83,857	5	11	..	2 15-in. smooth-bores, 2 12-pr. H.	..	5·6	160	105
a.c.	**New York**	S.	8200	380	6	64	10	26	8	2	17,401	Philadelphia	1891	613,377	4	5½–10	6–3	6 8-in., 12 4-in. Q.F., 8 6-pr., 2 1-pr., 2 M., 2 l.	2	21·0	750 1290	556
t.	**Ohio**	S.	12,500	388	0	72	3	25	6	2	16,000 W. T.	S. Francisco	Bldg.	595,705	8½–12 K.	9–12 K.	2¾–4	4 12-in., 16 6-in. Q.F., 20 6-pr., 6 1-pr., 4 M., 1 l.	2 sub.	18·0	1000 2000	515
b.	**Oregon**	S.	10,288	348	0	69	3	27	2	2	11,111	S. Francisco	1893	653,447	18	6–17	2¾	4 13-in., 8 8-in., 4 6-in. Q.F., 20 6-pr., 6 1-pr., 2 M., 1 l.	3	16·7	400 1594	473
c.d.s.,t. (1 t.)	**Passaic**	I.	1875	200	0	46	0	11	6	1	340	Brooklyn	1863	86,956	5	11	..	2 15-in. smooth-bores, 2 12-pr. H.	..	6·0	160	105
c.d.s.,t. (2 t.)	**Puritan**	I.	6060	289	6	60	1½	18	6	2	3,700	Chester	1882 reblt.	..	6–14	8–14	2	4 12-in., 6 4-in. Q.F., 6 6-pr., 2 1·4-in., 2 1-pr., 1 l.	..	12·4	320	230
c.d.s.,t. (2 t.)	**Terror**	I.	3990	259	6	55	6	15	4	2	1,600	Philadelphia	1883 reblt.	..	7	11½	1¾	4 10-in., 2 6-pr., 2 3-pr., 4 1-pr., 2 M., 1 l.	..	10·5	250	176
a.c.	**Texas**	S.	6315	301	4	64	1	24	6	2	8,610	Norfolk	1892	513,716	12	12	2	2 12-in., 6 6-in., 12 6-pr. Q.F., 10 1-pr., 2 M., 1 l.	6	17·8 (*t*)	500 850	389
t.	**Wisconsin**	~~S.~~	11,525	368	0	72	3	25	5	2	10,000	S. Francisco	1898	549,666	9½–16½	10–15	2¾–4	4 13-in., 14 6-in. Q.F., 16 6-pr., 4 1-pr., 4 M., 2 l.	4	16·0	800 1200	489
c.d.s.,t. (1 t.)	**Wyandotte**	I.	2100	225	0	43	8	13	6	1	340	Cincinnati	1864	131,401	5	10	..	2 15-in. smooth-bores, 2 12-pr. H.	..	6·0	160	105
c.d.s.,t. (1 t.)	**Wyoming**	S.	8,000	252	0	50	0	12	6	2	2,400	S. Francisco	Bldg.	200,350	11	10–11	1½	2 12-in., 4 4-in. Q.F., 3 6-pr., 4 1-pr.	..	11·5	200	131

The new programme includes 3 battleships (13,500 tons), 3 armoured cruisers (12,000 tons), 3 protected cruisers (6,000 tons) and 6 third-class cruisers (2,500 tons).

UNITED STATES.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots.	tons.	
cr.	**Albany** (ex Abreu)	S. sh.	3437	346	0	43	9	16	10	2	7500	Elswick	1899	247,611	..	3	6 6-in. Q.F., 4 4·7-in., 10 6-pr., 4 3-pr., 4 M., 2 l.	3	20·0	700/800	407
g.b.	**Annapolis**	S. sh.	1000	168	0	36	0	12	7	1	1227 B.&W.	Elizabeth Pt.	1896	46,789	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 M.	..	13·1 (t)	100/225	135
cr.	**Atlanta**	S.	3000	271	3	42	2	21	1	1	4030	Chester	1884	126,785	..	1½	2 8-in., 6 6-in. Q.F., 6 6-pr., 4 1-pr., 2 M., 1 l.	..	15·6	490	278
cr.	**Baltimore**	S.	4413	327	6	48	7	23	11	2	10,064	Philadelphia	1888	272,270	4½	4–2½	4 8-in., 6 6-in., 4 6-pr., 2 3-pr., 2 1-pr., 6 M., 1 l.	5	20·1	400/1143	386
g.v.	**Bancroft**	S.	839	187	6	32	0	12	11	2	1213	Elizabeth Pt.	1892	51,371	..	½	4 4-in. Q.F., 6 6-pr., 8 3-pr., 1 1-pr., 1 M.	1	14·37	100/136	195
g.v.	**Bennington**	S.	1710	230	0	36	0	16	7	2	3436	Chester	1890	100,894	..	½	6 6-in., 2 6-pr., 2 3-pr., 4 M., 1 l.	..	17·5	200/403	195
cr.	**Boston**	S.	3000	271	3	42	2	21	1	1	4300	Chester	1884	127,196	..	1½	2 8-in., 6 6-in., 2 6-pr., 2 3-pr., 2 1-pr., 2 1·8-in., 2 1·4-in., 2 M., 1 l.	..	15·6	495	278
g.v.	**Castine**	S.	1177	204	0	32	1	14	4	2	2199	Bath, Me.	1892	65,450	..	½	8 4-in. Q.F., 4 6-pr., 2 1-pr., 1 M., 1 l.	..	16·0	125/292	151
cr.	**Charleston**	S.	3730	312	7	46	2	21	8	2	6666	S. Francisco	1888	209,103	2	2–3	2 8-in., 6 6-in., 4 6-pr., 2 3-pr., 6 1-pr., 2 M., 1 l.	4	18·2	328/757	306
cr.	**Chicago**	S.	4500	325	0	48	2	22	6	2	9000 B &W. (½)	Chester	1885	182,677	4	1½	4 8-in. Q.F., 14 5-in. Q.F., 7 6-pr., 2 1-pr., 2 M., 1 l.	..	18·0	831	409
cr.	**Cincinnati**	S.	3213	300	0	42	0	20	2	2	10,000	Brooklyn	1892	226,055	..	2½	1 6-in., 10 5-in. Q.F., 8 6-pr., 2 1-pr., 2 M., 1 l.	2	19·0	350/468	314
cr.	**Columbia**	S.	7375	412	0	58	2	25	7	3	18,509	Philadelphia	1892	559,950	4	4–2½	1 8-in., 2 6-in., 8 4-in. Q.F., 12 6-pr., 2 1-pr., 2 M., 1 l.	4	22·8 (t)	750/1670	477
g.v.	**Concord**	S.	1710	230	0	36	0	16	7	2	3405	Chester	1890	100,894	..	½	6 6-in., 2 6-pr., 2 3-pr., 2 1·4-in., 2 M., 1 l.	..	16·8	200/401	194

UNITED STATES.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots.	tons.	
cr.	**Detroit** . . .	S.	2089	257	0	37	0	16	8	2	5277	Baltimore .	1891	125,860	..	½	10 5-in. Q.F., 6 6-pr., 2 1-pr., 2 M., 1 l. .	2	18·71	200 / 340	256
g.v.	**Dolphin** . . .	S.	1486	240	0	32	0	17	1	1	2253	Chester .	1884	64,728	..	..	3 4-in. Q.F., 2 14-pr., 2 6-pr., 2 3-pr., 2 M.	..	15·5	273	117
cr.	**Don Juan de Austria***	I.	1130	210	0	32	0	12	6	1	1600	Carthagena .	1889	..	..	..	4 5-in. Q.F., 4 6-pr., 4 M.† . . .	3	14 0	210	130
g.v.	**Helena** . . .	S.	1397	250	9	40	1	10	0	2	1988	Newport News	1896	57,536	..	½	8 4-in. Q.F., 4 6-pr., 4 1-pr., 2 M., 1 l. .	..	15·5 (*t*)	100 / 300	256
cr	**Isla de Cuba*** . .	S.	1030	185	0	30	0	11	6	2	2200	Elswick .	1887	..	..	2½	4 4-in. Q.F., 4 6-pr., 4 M.† . . .	3	16·0	160	160
cr.	**Isla de Luzon*** . .																				
g.v.	**Machias** . . .	S.	1177	204	0	32	1	14	4	2	2046	Bath, Me. .	1891	65,450	..	½	8 4-in. Q.F., 4 6-pr., 2 1-pr., 1 M., 1 l. .	..	15·46	125 / 292	151
cr.	**Marblehead** . .	S.	2089	257	0	37	0	16	8	2	5451	Boston .	1892	138,498	..	½	10 5-in. Q.F., 6 6-pr., 2 1-pr., 2 M., 1 l. .	2	18·4	200 / 340	248
g.b.	**Marietta** . . .	S. sh.	1000	174	0	34	0	13	5	2	1054 B.&W.	S. Francisco.	1896	45,823	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 M., 1 l. .	..	13·2 (*t*)	120 / 226	140
cr.	**Minneapolis** . .	S.	7375	412	0	58	2	25	7	3	20,862	Philadelphia	1893	552,754	4	4–2½	1 8-in., 2 6-in., 8 4-in. Q.F., 12 6-pr., 2 1-pr., 2 M., 1 l.	4	23·0 (*t*)	750 / 1891	477
cr.	**Montgomery** . .	S.	2089	257	0	37	0	16	8	2	5580	Baltimore .	1891	125,860	..	½	10 5-in. Q.F., 6 6-pr., 2 1-pr., 2 M., 1 l. .	2	19·0	200 / 340	257
g.v.	**Nashville** . . .	S.	1371	220	0	38	1	12	0	2	2536	Newport News	1895	57,536	..	½	8 4-in. Q.F., 4 6-pr., 2 1-pr., 2 M., 1 l. .	1	16·7 (*t*)	150 / 400	176
cr.	**Newark** . . .	S.	4098	311	7	49	2	22	7	2	8869	Philadelphia	1890	256,437	3	3–2	12 6-in. Q.F., 8 6-pr., 4 1-pr., 2 M., 1 l. .	..	19·0	400 / 809	384
cr.	**New Orleans** (ex	S. sh.	3437	346	0	43	9	20	2	2	7500	Elswick .	1896	293,684	..	3–1¼	6 6-in. Q.F., 4 4·7-in., 10 6-pr., 4 3-pr., 4 M., 2 l.	3	20·0	700 / 800	407

g.b.	Newport . . .	S. sh.	1000	168	0 36	0 12	7	1	1008	Bath, Me. .	1896	47,406	..	..	6 4-in. Q.F., 4 6-pr. 2 1-pr., 1 M. . .	..	12·3 (t)	100/239	135
cr.	**Olympia** . . .	S.	5870	340	0 53	1 24	10	2	17,313	S. Francisco.	1892	369,054	4½–3½	4–2½	4 8-in., 10 5-in. Q.F., 14 6-pr., 7 1-pr., 2 M., 1 l.	6	21·69	400/1169	450
g.v.	**Petrel** . . .	S.	892	176	3 31	0 13	5	1	1095	Baltimore .	1888	50,755	..	½	4 6-in., 2 3-pr., 2 1-pr., 2 1·4-in., 2 M. .	..	11·8	100/200	122
cr.	**Philadelphia** . .	S.	4324	327	6 48	7 23	5	2	8815	Philadelphia	1889	277,405	..	4–2½	12 6-in., 4 6-pr., 4 1-pr., 2 M., 1 l. . .	..	19·68 (t)	400/1085	384
g.b.	**Princeton** . . .	S. sh.	1000	168	0 36	0 12	7	1	800	Camden .	1897	47,262	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 M. . .	..	12·0	100/238	135
cr.	**Raleigh** . . .	S.	3213	300	0 42	0 20	2	2	10,000	Norfolk .	1892	226,055	..	2½	1 6-in., 10 5-in. Q.F., 8 6-pr., 4 1-pr., 2 M., 1 l.	2	19·0	350/460	313
cr.	**San Francisco** . .	S.	4098	310	0 49	2 22	3	2	9913	S. Francisco.	1889	293,435	..	3–2	12 6-in. Q.F., 4 6-pr., 4 3-pr., 2 1-pr., 6 M., 1 l.	4	19·5	350/628	383
cr.	**Vesuvius** . . . (Dynamite Gun Cruiser)	S.	929	252	4 26	6 11	2	2	3795	Philadelphia	1888	71,963	..	¼	3 15-in. dynamite guns, 5 3-pr., 1 M. .	..	21·4	152	69
g.v.	**Vicksburg** . . .	S. sh.	1000	168	0 36	0 12	7	1	1118	Bath, Me. .	1896	47,406	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 M. . .	..	12·7 (t)	100/239	135
g.v.	**Wheeling** . . .	S. sh.	1000	174	0 34	0 12	7	2	1081	S. Francisco.	1897	65,540	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 M., 1 l. .	..	12·9 (t)	120/226	140
g.v.	**Wilmington** . .	S. sh.	1397	250	9 40	1 10	0	2	1894	Newport News	1895	57,536	..	¼	8 4-in. Q.F., 4 6-pr., 4 1-pr., 4 M., 1 l. .	..	15·0 (t)	100/300	175
g.v.	**Yorktown** . . .	S.	1710	230	0 36	0 16	7	2	3392	Philadelphia	1888	93,496	..	¼	6 5-in. Q.F., 2 6-pr. Q.F., 2 3-pr., 4 1-pr., 2 M., 1 l.	2	16·1	200/380	195

*** Captured at Manila after the battle of May 1, 1898. The following gunboats and some others were also captured at Cuban ports and in the Philippines: first-class, Hernan Cortez, Pizarro, Vasco Nuñez de Balboa, Diego Velasquez, Alvarado and Sandoval; second and third-class, Alerta, Ardilla, Fradera, Flecha, Ligera, Satelite, Margarit, Vigia, General Blanco, Intrepida, Cauto, and Leyte.**

† New armament of the captured cruisers.

Enrolled Auxiliary Cruisers of the United States Navy.

	Class.	NAME.	Material of Hull.	Gross Tonnage.	Length.	Beam.	Depth.	Propellers.	Indicated Horse-Power.	Where Built.	When Built.	Owners.	Armament, all Q.F.	Speed.
Atlantic Coast.	1st	St. Louis	S.	11,629	535 5	63 0	26 8	2	18,000	Philadelphia	1895	International Navigation Company.	8 5·5-in., 4 6-pr., 4 M.	22·2
	1st	St. Paul	S.	11,629	535 5	63 0	26 8	2	18,000	,,	1895	,,	8 5·5-in., 4 6-pr., 4 M.	22·5
	1st	Paris.	S.	10,794	517 0	63 3	22 0	2	20,000	Clydebank, Scotland	1889	,,	12 5·5-in., 6 6-pr., 6 M.	20·7
	1st	New York	S.	10,802	517 0	63 3	22 0	2	20,000	,,	1888	,,	12 5·5-in., 6 6-pr., 6 M.	20·6
	3rd	Newport	I.	2735	326 0	38 2	23 9	1	..	Chester, Pa.	1880	Pacific Mail.	8 4-in., 8 M.	16·0
	3rd	City of Para	I.	3532	345 0	38 6	19 9	1	2250	,,	1878	,,	8 4-in., 8 M.	12·0
	3rd	Caracas	I.	2584	283 6	40 2	20 5	1	..	Philadelphia	1889	Red D Line.	8 4-in., 6 M.	13·0
	3rd	Philadelphia	I.	2520	300 0	35 0	20 6	1	..	,,	1885	,,	8 4-in., 6 M.	12·0
	3rd	Venezuela	I.	2843	303 6	40 2	20 5	1	..	,,	1889	,,	8 4-in., 8 M.	..
	3rd	Orizaba	S.	3497	336 2	43 2	22 0	1	..	Chester, Pa.	1889	Cuba Mail.	8 4-in., 6 M.	14·0
	3rd	Yumuri	S.	3497	336 2	43 2	22 3	1	..	,,	1889	,,	8 4-in., 6 M.	14·0
	3rd	City of Washington	I.	2684	300 5	38 4	19 2	1	2500	,,	1877	,,	8 4-in., 8 M.	15·0
	3rd	Saratoga	I.	2820	298 0	38 6	23 5	1	..	,,	1878	,,	8 4-in., 8 M.	14·0
	3rd	Seneca	I.	2729	271 5	40 0	16 4	1	..	,,	1884	,,	8 4-in., 6 M.	..
	3rd	Yucatan	I. & S.	3525	336 2	43 2	22 3	1	..	,,	1890	,,	8 4-in., 6 M.	14·0
	3rd	Segurança	S.	4033	321 3	45 3	17 4	1	..	,,	1890	,,	6 5-in., 4 4-in., 4 1-pr., 3 M.	14·0
	3rd	Vigilancia	S.	4115	321 8	45 2	16 5	1	..	,,	1890	,,	6 5-in., 4 4-in., 4 1-pr., 3 M.	14·0
	4th	Advance	I.	2605	295 0	38 0	23 4	1	1350	,,	1883	Panama R. R. Co.	Small Q.F.	15·0

Pacific Coast.	3rd	City of Peking	I.	5079	408	0	47	0	19	5	1	4500	,,	1874	,,	6 5-in., 12 6-pr.	13·0
	3rd	City of Rio de Janeiro	I.	3548	345	0	38	6	19	9	1	2000	,,	1878	,,	8 4-in., 8 M.	14·0
	3rd	Peru	S.	3528	336	0	45	9	27	6	1	2800	San Francisco	1892	,,	9 5-in., 12 6-pr.	14·0
	4th	City of Panama	I.	1490	248	0	36	0	20	2	1	650	Chester, Pa.	1873	,,	Small Q.F.	..
	4th	Colon	I.	2686	280	0	40	0	28	6	1	1350	,,	1872	,,	,,	..
	4th	San Jose	I.	2081	283	0	37	0	21	0	1	1400	,,	1882	,,	,,	..
	4th	San Blas	I.	2075	283	0	37	0	21	0	1	1400	,,	1882	,,	,,	..
	4th	San Juan	I.	2076	283	0	37	0	21	0	1	1400	,,	1882	,,	,,	..
	4th	Acapulco	I.	2572	290	0	40	0	20	0	1	1350	Wilmington	1873	,,	,,	..

Converted Merchant Vessels Retained.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
															Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			tons.	ft.	in.	ft.	in.	ft.	in.	No.				£	in.	in.			knots.	tons.	
cr.	Badger	S.	4784	326	6	42	0	18	6	1	3200	Chester	1889	75,412	..	..	6 5-in. Q.F., 6 3-pr.	..	16·0	836	235
cr.	Buffalo	S.	6888	380	6	48	0	22	0	1	3600	Newport News	1893	117,949	..	..	2 5-in. Q.F., 4 4-in., 6 6-pr., 2 M.	..	14·5	100	297
cr.	Dixie	S.	6114	389	2	48	0	19	11	1	1371	Newport News	1893	117,919	..	..	10 6-in. Q.F., 6 6-pr., 2 M.	..	16·0	1371	181
cr.	Panther	I.	4260	310	0	40	0	18	3	1	..	Philadelphia	1889	77,055	..	..	6 5-in. Q.F., 2 4-in., 6 3-pr., 1 M., 1 l.	..	13·0	475	198
cr.	Prairie	I.	6872	390	6	46	10	22	0	1	3800	Philadelphia	1890	117,949	..	..	10 6-in. Q.F., 6 6-pr., 2 M.	..	14·5	1000	295
cr.	Yankee	I.	6888	380	6	48	0	22	0	1	3800	Newport News	1892	117,949	..	..	10 5-in. Q.F., 6 6-pr., 2 M.	..	14·5	1000	282
cr.	Yosemite	I.	6179	389	2	48	0	20	1	1	3800	Newport News	1892	117,949	..	..	10 6-in. Q.F., 6 6-pr., 2 M.	..	16·0	1371	285
cr.	Mayflower (yacht)	S.	2690	275	0	36	0	17	3	2	4700	Clydebank	1896	88,359	..	..	2 5-in. Q.F., 12 6-pr., 2 M.	..	16·8	584	160

SHIPS BELONGING TO POWERS WHOSE NAVIES ARE OF LITTLE OR NO IMPORTANCE.

Belgium.—Twelve steam vessels, between 419 and 684 tons net, launched between 1870 and 1888, principally employed as packets, which are under the orders of the Government.

Bulgaria.—Eleven steamers of small size, of which one is used as the Prince's Yacht. Two armoured gunboats, for the defence of the Danube, building at Leghorn. Other ships are to be laid down. The Nadiezda, a despatch vessel (715 tons) of the French Casabianca type; length, 219 ft. 6 in.; beam, 27 ft. 6 in.; draught, 12 ft. 6 in.; launched at Bordeaux in 1898, steamed at 18·85 knots at her trials; engines, 2600 I.H.P.; Lagrafel and d'Allest boilers; armament, 2 3·9-in., 3 1·8-in. Q.F., and 2 torpedo-tubes.

Egypt.—This Power has now no efficient warships.

Hayti.—Steel gun vessel—Crête à Pierrot—940 tons, length 210 ft., beam 30 ft.; 1 6·2-in., 1 4·7-in., and 4 3·9-in. Q.F., 6 M. Steel gunboat—Capois la Mort—260 tons, 1 3·9-in., and 4 1-pr. Q.F. Iron corvette—Dessalines—1200 tons, armed with 1 3·9-in. Q.F., 2 3·9-in. B.L., 2 l., 2 M. Three iron or steel sloops:—St. Michael, 1804, and Toussaint L'Ouverture, of from 500 to 900 tons, all of 12 to 14 knots speed, and armed with one large and four to eight small guns. Gun vessel, 22nd of December, of 900 tons, 9 knots speed, armed with four 40-pr. Armstrongs.

Liberia.—The Gorronommah gunboat, of 150 tons displacement, completed 1892; and another one, the Rocktown, completed at Rotterdam in 1896 (12 knots on trial).

Mexico.—The Zaragoza, built of steel, 1200 tons, 1300 horse-power, 15 knots speed, and armed with four 4·7-in. guns and 4 rapid-firing guns. Two gun vessels, Democrata and Mexico, of 450 tons and 11 knots speed, armed with two 6½-inch muzzle loaders and two small guns. Two small gunboats of 10 knots speed. A gunboat is in hand at New Orleans. Five torpedo-boats.

Morocco.—A torpedo cruiser, of 1200 tons displacement, 2500 HP., 18 knots speed, and carrying two guns, 4·7-in. B.L., and 4 Q.F. guns, built in 1892. A gunboat of 450 tons, 1200 I.H.P., 14·5 knots, is completing at Sampierdarena (Maclaren & Wilson), and another has been laid down.

Persia.—Despatch vessel—the Persepolis—of 1200 tons and 10 knots speed. She is armed with 5 small breech-loading guns.

Peru.—Lima, built in 1881, of 1700 tons displacement, 1800 horse-power, and 16 knots speed; armed with two 6-in. B.L.R. guns. Screw steamer Santa Rosa, of about 400 tons.

Roumania.—Elizabeta, protected cruiser (deck 3 in. thick), built in 1887 at Elswick; 230 ft. long, 32 ft. 10 in. beam, 1320 tons, 4500 I.H.P.; 4 5·9-in. B.L.R., 4 Q.F., 2 M., 4 torpedo tubes. Composite gunboat Mircea, 350 tons; Grivitza, 180 tons. Six gunboats of 45 to 110 tons, 7 to 9 knots speed. Six coast-guard vessels—Oltul, Siretul, Bistritza, Olteano, Smeo, and Monteano—95 tons, 100 ft. long, 13·6 in. beam, 6 ft. draught; speed, natural draught 11 knots, forced draught 13½ knots; 1 Q.F., 2 M. Screw steamer—Romania—240 tons, repaired 1890. Six first-class torpedo-boats (120 ft. 6 in., 21 knots); 2 second class (63 ft., 16·5 knots), built 1882–1888. The shipbuilding programme contemplates the building of 8 monitors of 500 tons, 12 torpedo-boats and 8 vedettes for the Danube, and 6 coast-defence vessels of 3500 tons, 4 destroyers of 300 tons, and 12 torpedo-boats for the Black Sea.

Saint Domingo.—The Independencia, built in England 1894, 170 ft. long, 25 ft. broad, displacement 322 tons, and armed with seven Hotchkiss quick-firing guns. Restauracion, steel gun-vessel, 1000 tons, launched at Glasgow in 1896. The 14-knot cruiser Presidente has been reconstructed, and carries seven guns.

Sarawak.—Two gunboats, of 175 and 118 tons respectively of low speed, each armed with two guns.

Siam.—Two corvettes (800 tons, 8 guns); six gunboats. One deck-protected cruiser, the Maha Chakrkri, 290 ft. long, 39 ft. 4 in. broad, of 2500 tons displacement and 17 to 18 knots speed; armament, four 4·7-in. quick-firing guns, and ten 6-pr. quick-firing guns. Cruiser Makut-Rajakamar, 650 tons.

Uruguay.—Gunboats: General Artigas, 274 tons, 12½ knots speed, 2 4·7-in. (Krupp), 2 M.; General Rivera, 300 tons, 12 knots speed, armed with 1 5·9-in. and 1 2·3-in. gun; and the General Jaurez.

Venezuela.—Gun-vessel, Libertador, 832 tons. Four river gunboats building.

BRITISH AND FOREIGN TORPEDO-BOAT FLOTILLAS.

Great Britain and Dependencies.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
Great Britain.			Feet	Feet.	Feet.		Tons.		Knots.				Tons.
TORPEDO-BOAT DESTROYERS.													
Ardent	Chiswick ..	1894	201·6	19	7·3	2	247	4,500	27·97	1-12 pr. 5-6 prs.	2	45	60
Banshee	Birkenhead ..	1894	210	19·5	..	2	290	4,400	27·97	1-12 pr. 5-6 prs.	2	50	
Boxer	Chiswick ..	1894	201·6	19	7·3	2	247	4,500	27·17	1-12 pr. 5-6 prs.	2	45	60
Bruiser	Chiswick ..	1895	201·6	19	7·3	2	247	4,500	27·97	1-12 pr. 5-6 prs.	2	45	60
*Charger	Poplar	1894	190	18·5	5·25	2	250	3,100	27·98	1-12 pr. 5-6 prs.	2	45	60
Conflict	East Cowes ..	1894	205·6	20	..	2	270	4,370	27·21	1-12 pr. 5-6 prs.	2	50	
Contest	Birkenhead ..	1894	210	19·5	..	2	290	4,400	27·4	1-12 pr. 5-6 prs.	2	50	
Daring	Chiswick ..	1893	185	19	7	2	237	4,300	27·70	1-12 pr. 3-6 prs.	3	45	50
*Dasher	Poplar	1895	190	18·5	5·25	2	250	3,182	26·21	1-12 pr. 5-6 prs.	2	45	60
Decoy	Chiswick ..	1894	185	19	7	2	237	4,300	27·76	1-12 pr. 3-6 prs.	3	45	50
Dragon	Birkenhead ..	1894	210	19·5	..	2	290	4,500	27·14	1-12 pr. 5-6 prs.	2	50	
Ferret	Birkenhead ..	1893	194	19·25	5	2	280	4,810	27·62	1-12 pr. 3-6 prs.	3	50	70
Fervent	Paisley	1895	203	19	7·8	2	270	3,[illegible]00	[27]	1-12 pr. 5-6 prs.	2	50	70
Handy	Govan	1895	200	19	7·8	2	260	3,800	27·04	1-12 pr. 5-6 prs.	2	50	70
Hardy	Sunderland ..	1895	196	19	5	2	245	4,200	26·8	1-12 pr. 5-6 prs.	2	50	70
Hart	Govan	1895	185	19	7	2	260	4 010	27·07	1-12 pr. 5-6 prs.	2	50	70
*Hasty	Poplar	1894	190	18·5	5·25	2	250	3,250	26·08	1-12 pr. 5-6 prs.	2	45	60
Haughty	Sunderland ..	1895	196	19	5	2	265	4,000	27·1	1-12 pr. 5-6 prs.	2	50	60
Havock	Poplar	1893	180	18·5	5·25	2	240	3,500	26·77	1-12 pr. 3-6 prs.	3	43	57
Hornet	Poplar	1893	180	18·5	5·25	2	240	4,000	27·31	1-12 pr. 3-6 prs.	3	43	57
Hunter	Govan	1895	..	..	..	2	260	4,000	27·2	1-12 pr. 5-6 prs.	2		
Janus	Jarrow	1895	200	19·7	6·5	2	252	3,789	27·8	1-12 pr. 5-6 prs.	2	50	60
Lightning	Jarrow	1895	200	19·7	6·5	2	252	4,007	27·94	1-12 pr. 5-6 prs.	2	50	60
Lynx	Birkenhead ..	1894	194	19·25	5	2	280	4,000	27·00	1-12 pr. 3-6 prs.	3	50	70
Opossum	Hebburn ..	1895	200	19	5·2	2	290	4,052	28·24	1-12 pr. 5-6 prs.	2	50	60
Porcupine	Jarrow	1895	200	19·7	6·5	2	288	3,866	27·91	1-12 pr. 5-6 prs.	2	50	60
Ranger	Hebburn ..	1895	200	19	5·2	2	264	3,900	27·13	1-12 pr. 5-6 prs.	2	50	60
Rocket	Clydebank ..	1894	205·6	19·5	5·25	2	280	4,200	27·37	1-12 pr. 5-6 prs.	2	50	60
Salmon	Hull	1895	200	19·5	5·4	2	264	3,580	27·6[illegible]	1-12 pr. 5-6 prs.	2	50	60
Shark	Clydebank ..	1894	205·6	19·5	5·25	2	280	4,250	27·59	1-12 pr. 5-6 prs.	2	50	60
Skate	Barrow	1895	195	20·5	..	2	265	4,100	27·10	1-12 pr. 5-6 prs.	2	50	60
Snapper	Hull	1895	200	19·5	5·5	2	270	4,500	27·9	1-12 pr. 5-6 prs.	2	50	60
Spitfire	Elswick ..	1895	200	19	5·3	2	300	3,780	27·5	1-12 pr. 5-6 prs.	2	45	60
Starfish	Barrow	1894	195	20·5	..	2	265	4,000	27·97	1-12 pr. 5-6 prs.	2	45	60
Sturgeon	Barrow	1894	195	20·5	..	2	265	4,010	27·16	1-12 pr. 5-6 prs.	2	45	60
Sunfish	Hebburn ..	1895	200	19	5·2	2	290	4,292	27·62	1-12 pr. 5-6 prs.	2	50	60
Surly	Clydebank ..	1894	205·6	19·5	5·25	2	280	4,400	28·05	1-12 pr. 5-6 prs.	2	50	60
Swordfish	Elswick ..	1895	200	19	5·3	2	300	4,100	[27]	1-12 pr. 5-6 prs.	2	45	60
Teazer	East Cowes ..	1895	200	19·5	5·6	2	270	4,500	[27]	1-12 pr. 5-6 prs.	2	50	60
Wizard	East Cowes ..	1895	200	19·5	5·2	2	270	4,400	[27]	1-12 pr. 5 6 prs.	2	45	60
Zebra	Blackwall ..	1895	200	20	6	2	300	3,850	27·00	1-12 pr. 5-6 prs.	2	50	60
Zephyr	Paisley	1895	200	19	5·3	2	270	3,850	[27]	1-12 pr. 5-6 prs.	2	50	60
Albatross	Chiswick ..	bldg.	227·6	21·3	8·9	2	360	7,900	32	1-12 pr. 5-6 prs.	2	6[illegible]	100
Angler	Chiswick ..	1896	210	19·6	7·1	2	278	5,800	30·37	1-12 pr. 5-6 prs.	2	60	80
Arab	Clydebank ..	bldg.	Design not complete							1-12 pr. 5-6 prs.	2	60	80
Ariel	Chiswick ..	1897	210	19·6	7·1	2	278	5,800	30·59	1-12 pr. 5-6 prs	2	60	80
Avon	Barrow	1896	210·6	21·6	5·6	2	300	6,000	30	1-12 pr. 5-6 prs	2	60	80
Bat	Jarrow	1896	210·6	21·6	5 8	2	300	5,900	30	1-12 pr. 5-6 prs.	2	60	80
Bittern	Barrow	1897	210·6	21·6	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Brazen	Clydebank ..	1896	218	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Bullfinch	Hull	bldg.	210	20·6	5·8	2	300	5,800	30	1-12 pr. 5-6 prs.	2	60	80
Chamois	Jarrow	1896	210·5	20·6	6·9	2	325	6,265	30·3	1-12 pr. 5 6 prs.	2	60	80
Cheerful	Hebburn ..	1897	210	21·0	8	2	308	6,000	30	1-12 pr. 5-6 prs.	2	62	82
Coquette	Chiswick ..	1898	210	19·6	7·2	2	285	5,800	30	1-12 pr. 5-6 prs.	2	60	80
Crane	Jarrow	1896	215	20·7	6·8	2	324	6,336	30·3	1-12 pr. 5-6 prs.	2	60	80
Cygnet	Chiswick ..	1898	210	19·6	7·2	2	285	5,800	30	1-12 pr. 5-6 prs.	2	60	80
Cynthia	Chiswick ..	1898	210	19·6	7·3	2	285	5,800	30	1-12 pr. 5-6 prs.	2	60	80
Desperate	Chiswick ..	1895	210	19·6	7·2	2	275	5,800	30	1-12 pr. 5-6 prs.	2	60	80
Dove	Hull	bldg.	210·0	20·6	5·8	2	300	5,800	30	1-12 pr. 5-6 prs.	2	60	80
Earnest	Birkenhead ..	1896	210·6	21·7	5·3	2	300	6,000	30·13	1-12 pr. 5-6 prs	2	5[illegible]	80
Electra	Clydebank ..	bldg.	218	20·0	5·6	2	300	6,000	30	1-12 pr. 5 6 prs.	2	5[illegible]	80
Express	Birkenhead ..	1897	227 6	22·0	9	2	300	7,700	33	1-12 pr. 5-6 prs.	2	60	80
Fairy	Govan	1897	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Fame	Chiswick ..	1896	210·6	19·6	7·1	2	275	5,800	30·16	1-12 pr. 5 6 prs.	2	60	80

* These boats, built by Yarrow, are now being fitted with Thornycroft boilers at Earle's Shipbuilding and Engineering Company, Limited.

Great Britain and Dependencies—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
TORPEDO BOAT DESTROYERS			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Fawn	Jarrow	1897	215	20·7	6·8	2	324	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Flirt..	Jarrow	1897	215	20·7	6·8	2	324	6,452	30·46	1-12 pr. 5-6 prs.	2	60	80
Flyingfish	Jarrow	1897	215	20·7	6·8	2	324	6,457	30·4	1-12 pr. 5-6 prs.	2	58	80
Foam	Chiswick ..	1896	210	19·6	7·1	2	275	5,800	30·18	1-12 pr. 5-6 prs.	2	58	80
Gipsy	Govan	1897	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Griffon	Birkenhead ..	1896	210·0	20	5·3	2	300	6,000	30·11	1-12 pr. 5-6 prs.	2	58	80
Kestrel	Clydebank ..	bldg.	218	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Lee	Sunderland ..	bldg.	210 0	19·9	7·6	2	283	5,400	30	1-12 pr. 5-6 prs.	2	58	80
Leopard	Barrow	1897	210	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Leven	Glasgow ..	bldg.	218 0	20.0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Locust	Birkenhead ..	1896	210	21·7	5·3	2	300	6,000	30·16	1-12 pr. 5-6 prs.	2	58	80
Mallard	Chiswick ..	1896	210·6	19·6	7·1	2	275	5,800	30·11	1-12 pr. 5-6 prs.	2	60	80
Mermaid	Hebburn ..	1898	210	21·0	8	2	308	6,000	30	1-12 pr. 5-6 prs.	2	62	82
Orwell	Birkenhead ..	bldg.	218·0	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Osprey	Govan	bldg.	227·6	22·0	9	2	300	7,700	32	1-12 pr. 5-6 prs.	2	60	80
Otter..	Barrow	1896	210	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Panther	Birkenhead ..	1897	210·6	21·7	5·3	2	300	6,000	30·14	1-12 pr. 5-6 prs.	2	58	80
Quail	Birkenhead ..	1895	213·6	21·6	5·3	2	300	6,000	30·38	1-12 pr. 5-6 prs.	2	58	90
Recruit	Glasgow ..	bldg.	218·0	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Seal..	Birkenhead ..	1897	218·0	20·0	5·6	2	300	6,000	30·15	1-12 pr. 5-6 prs.	2	58	80
Sparrowhawk	Birkenhead ..	1896	210·6	21·7	5·3	2	300	6,000	30·13	1-12 pr. 5-6 prs.	2	58	80
Spiteful	Jarrow	bldg.	215	20·75	6·88	2	322	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Stag	Chiswick ..	bldg.	210·0	19·9	7·6	2	285	5,800	30	1-12 pr. 5-6 prs.	2	60	80
Star	Jarrow	1896	215	20·75	6·88	2	328	6,266	30·6	1-12 pr. 5-6 prs.	2	58	80
Sylvia	Sunderland ..	bldg.	210	19·9	7.6	2	283	5,400	30	1-12 pr. 5-6 prs.	2	58	80
Thrasher	Birkenhead ..	1896	210·6	21·7	5·3	2	300	6,000	30·13	1-12 pr. 5 6 prs.	2	58	80
Violet	Sunderland ..	bldg.	210	20·75	6·88	2	283	5,400	30	1-12 pr. 5-6 prs.	2	58	80
*Viper	Hebburn ..	1899	210	21	7	8	312½	6,500 10,000	31 35	1-12 pr. 5-6 prs.	2	62	88
Virago	Birkenhead ..	1896	210·6	21·7	5·3	2	300	6,000	30·13	1-12 pr. 5·6 prs.	2	58	80
Vulture	Clydebank ..	bldg.	218	20	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Whiting	Jarrow	1896	215	20·75	6·88	2	333	6,315	30·2	1- 2 pr. 5-6 prs.	2	58	80
Wolf	Birkenhead ..	1897	218	20	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
‡12 Unnamed													
FIRST CLASS—													
1 (*ex* Lightning)	Chiswick ..	1877	84·6	10·9	5	1	27	460	19	..	1	..	
2-9 (8 boats)	Chiswick ..	1878–9	87	10·9	4	1	28	450	20	..	1	15	
10	Chiswick ..	1880	90·5	10·9	4	1	28	450	21·7	..	1	15	
11, 12 (2 boats)	Chiswick ..	1880	87	10·9	4	1	28	450	20	..	1	15	7
13	Lambeth ..	1878	87	10·9	4	1	28	460	21	..	2	15	7
14	Poplar	1878	87	11	4·5	1	33	550	22	..	2	15	7
15	..	..	87	10·9	4	1	28	450	21	..	2	15	7
17, 18 (2 boats)	Poplar	1877	86	11	4·5	1	33	450	21	..	2	15	7
19	East Cowes ..	1878	87	10·9	4	1	28	460	21	..	2	15	7
20	..	1880	87	10	4	..	28	360	16·9	..	2	15	
21, 22 (2 boats)	Chiswick ..	1885	113	12·5	5·7	1	63	730	20	..	3	..	10
23, 24 (2 boats)	Poplar	1885–6	113	12·5	5·5	1	67	600	19·5	2–3 prs.	3		
25–29 (5 boats)	Chiswick ..	1886	127·5	12·5	6·2	1	60	600	21	..	4	15	
30–33 (4 boats)	Poplar	1886	125	13	5·5	1	60–66	670	19·5	2–3 prs.	5	15	20
34–38 (5 boats)	East Cowes ..	1886	125	14·6	4	1	60–66	950	18–19	..	5	15	
39, 40 (2 boats)	Poplar	1885	100	12·5	..	..	40	500	..	..	1	15	
41–60 (20 boats)	Chiswick ..	1886	127·5	12·5	6·2	1	60	700	21	2-3 prs.	4	15	
61, 63–74, 76–78 (16 boats)	Poplar	1886	125	13	5·5	1	75	700	19–20	2-3 prs.	5	15	20
79	Poplar	1886	125	13	5·5	..	75	1,000	22·4	2-3 prs.	..	15	20
80	Poplar	1887	135	14	6	1	105	1,540	23	4-3 prs.	5	21	30
81 (*ex* Swift)	East Cowes ..	1885	150	17·5	..	1	125	..	..	6-3 prs.	3	25	35
82–87 (6 boats)	Poplar	1889	130	13·5	5·5	1	85	1,100	23	3-3 prs.	3	19	20
88, 89 (2 boats)	Poplar	1894	142	14·75	4	1	112	1,600	..	3–3 prs.	3	18	20
90	Poplar	1895	140	14·25	3·75	1	100	1,430	..	3–3 prs.	3	18	18
91, 92 (2 boats)	Chiswick ..	1894	140	15·5	7·5	1	130	2,400	23-24	3–3 prs.	3	18	25
93	Chiswick ..	1893	140	15·5	5·4	2	130	2,200	23·5	3–3 prs.	3	18	25
94–96 (3 boats)	East Cowes ..	1894	140	15·5	..	1	130	2,000	23·2	3 3 prs.	3	18	25
97	Birkenhead ..	1893	140	15·5	..	1	130	2,690	23·35	3–3 prs.	3	18	25
SECOND CLASS—													
39–48 (10 boats)	Poplar	1889	60	9·2	3·7	1	16·5	230	16·5	1 mach.	1	9	11
49, 50 (2 boats)	Poplar	1887	60	8·5	3	1	15	200	17	1 mach.	1	9	
51–62 (12 boats)	Chiswick ..	1878–9	60·5	7·5	3·5	1	..	..	16·5	..	2	7	
63	..	1879	60	..	..	1	..	..	15	..	2		
64–73 (10 boats)	Chiswick ..	1880–1	60·5	7·5	3·5	1	..	..	16–17	..	2	7	
74, 75, 96, 97 (4 boats)..	Poplar	1883	62	7·6	3·6	1	12	..	16	1 mach.	2	7	
76–95 (20 boats)	Chiswick ..	1882–3	63	7·5	3·5	1	..	..	16·5–17	..	2	7	
98	Chiswick ..	1883	66·3	7·5	2·5	hyd.	..	120	12·6	..	2	7	
99, 100 (2 boats)	Chiswick ..	1886	64	8	3·6	1	..	..	16–16·8	..	2	7	
101	..	..	64	..	..	..	..	..	..	..	2	7	
1-9 (9 boats)	East Cowes ..	..	56	..	..	1	12	..	14·5	2 mach.	sp	..	·7
‡2 Unnamed													

* This vessel is fitted with the Parsons compound steam turbine.
† Supplemental programme, 1898–99.
‡ Programme 1899–1900.

Great Britain and Dependencies—*continued*.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Victoria.													
Childers	Chiswick ..	1883	113	12·5	5·9	1	65	730	20	2–1 prs.	..	12	16
One boat	Poplar	1891	130	13·5	5·7	1	82	1,150	23	3–3 prs.	3	19	20
Nepean, Lonsdale (2 boats)	Chiswick ..	1884	63	7·5	3·2	1	12	150	17 5	..	1	7	
New South Wales.													
Acheron, Avernus (2 boats)	..	1879	..	..	..	1	16	300	16				
Queensland.													
Mosquito	Chiswick ..	1884	63	7·5	3·2	1	12	..	17	..	1	7	
Wasp	..	..	..	..	..	..	12	..	..	..	..	7	
Tasmania.													
One boat	Chiswick ..	1884	63	7·5	3·2	1	12	..	17	..	1	7	
New Zealand.													
Nos. 1–4 (4 boats)	Chiswick ..	1884	63	7·5	3	1	12	170	17	1 mach.	Sp.		
India.													
Nos. 1–3 (3 boats)	Chiswick ..	1888	134·5	14·8	7·1	1	96	1,270	23·2	2 Q.F.	5		
Nos. 4–6 (3 boats)	East Cowes ..	1889	130	14·6	..	..	95	1,030	20				
No. 7	Paisley	1888	130·4	14	..	..	92	1,066	21				

Argentine Republic.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Santa Fé†	Poplar.. ..	1896	190	19·6	7·4	2	280	4,000	26·5 *t.*	*1 14-pr., 3 6-pr. Q.F., 2 M.	3	54	80
Corrientes	Poplar.. ..	1896	190	19·6	7·4	2	280	4,000	27·4 *t.*		3	54	80
Missiones..	Poplar.. ..	1896	190	19·6	7·4	2	280	4,000	26·0 *t.*		3	54	80
Entre Rios	Poplar.. ..	1896	190	19·6	7·4	2	280	4,000	26·7 *t.*		3	54	80
FIRST CLASS—													
2 boats	Chiswick ..	1890–1	150	14·5	5·2	2	110	1,500	24·52	3 3-prs.	3	27	22
6 boats	Poplar.. ..	1890	130	13·5	6	1	85	1,200	23–24	2 3-pr. Q.F.	2	15	15
4 boats	Poplar.. ..	1880–2	100	12·5	6	1	52	600	20	2 mach.	3	14	10
SECOND CLASS—													
Nos. 1–8 (8 boats)..	Poplar.. ..	1890	60	9.2	3	1	16	230	17	1 Q.F.	1	10	1·25
Nos. 9–10 (2 boats)	Chiswick ..	1881	60	7·5	3·5	1	16	230	17	..	1		
VEDETTE BOATS—													
Nos. 1–4 (4 boats) ..	..	1875	55	7	..	..	..	..	..	.	sp.		

The two 150-ft. boats are named Comodoro Py and Murature.
The six 130-ft. boats are named Bathurst, Buchardo, Jorge, King, Pinedo, and Thorne. They have locomotive boilers.
The four 100-ft. boats are named Alerta, Centella, Ferre, and Py.

* ¼-in. plating over entire engine and boiler space.
† The Santa Fé was lost in 1897, and Messrs. Yarrow are building a new destroyer to replace her, in which the Santa Fé's engines, recovered from the wreck, will be placed.

Austria-Hungary.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Adler, Falke	Poplar.. ..	1886	135	13·7	5·6	1	95	900	22·4	2 Nord.	2	16	28
22 boats	Elbing, Trieste, &c.	1886-9	128	15·9	6·9	1	83	900 / 1,000	17·5 to 21·5	2 mach.	2	15	28
Boa, Cobra, Kigyo, Python	Poplar.. ..	1898	152·6	15·3	7·6	1	133	2,000	24·3	2 3-pr. Q.F.	3	24	30
Viper	Poplar.. ..	1896	147·6	14·9	7·6	1	130	2,000	26·5	2 3-pr. Q.F.	2	26	30
Natter	Elbing ..	1896	150	17·5	8·8	2	152	2,300	26·5	2 3-pr. Q.F.	3	..	30
SECOND CLASS—													
Nos. 9, 10 (2 boats)	Chiswick, Poplar, Pola and Elbing	1881	98·5	10·8	2·9	1	37	450	17	1 Q.F.			
Nos. 11–32 (22 boats)		1883–7	107	11·6	3·1	1	47	600	17		1		
Nos. 33–39 (7 boats)		1887–91	118·1	14·4	3·3	1	64	700	18	2 Q.F.	1		
Nos. 2–8 (7 boats) ..	Pola and Poplar ..	1878-81	87·4	9·6	2·8	1	27	300	15	..	1		

Brazil.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Nos. 1–5 (5 boats	Poplar.. ..	1882	100	12·5	5·5	1	52	600	20	2 mach.	2	16	20
Araguary	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·1	2 Q.F.	4	27	22
Iguatemi	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·4	2 Q.F.	4	27	22
Marcilio Diaz	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·8	2 Q.F.	4	27	22
5 boats	Elbing ..	1892–3	152	17·2	7·9	2	130	2,200	28	2–1 prs.	3	24	30
Piratiny	..	..	130	12	..	..	..	..	10	2–1 pr.	1		
Poty	..	..	126	12	3	..	30	..	18	1–1 pr.	1		
SECOND CLASS—													
Inhanhuay (wood)..	New York..	1893	90	10	3	..	17	..	25	1–1 pr.	1	10	
4 boats	..	1883–4	..	..	..	1	17	..	17				
1 boat	Chiswick ..	1885	63	75	3·2	1	..	..	17	..	..	..	2
1 boat	Poplar.. ..	1886	60	8	3	1	14	200	17	..	1		
THIRD CLASS—													
Moxoto	Poplar.. ..	1883	60	9·3	..	..	..	..	16	1–1 pr.	1		
5 boats	Chiswick ..	1883	45	6	1·2	1	3·5	..	12–13	1 mach.	sp.		

Chili.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Capitan Orella ..	Birkenhead.	1896	210	21·6	..	2	300	6000	30·17	1-12 pr. Q F. 5-6 pr.	2	65	90
Capitan Munoz Gamero.. ..	Birkenhead.	1896	210	21·6	..	2	300	6000	30·42	1–12 pr. Q.F. 5–6 pr.	2	65	90
Teniente Serrano ..	Birkenhead.	1896	210	21·6	..	2	300	6000	30·35	1–12 pr. Q.F. 5·6 pr.	2	65	90
Guardia-Marina Riquelme	Birkenhead.	1896	210	21·6	..	2	300	6000	30·09	1-12 pr. Q.F. 5-6 pr.	2	65	90
Capitan Thompson, Teniente Rodrigues	Balcachuano	1898	210	21·6	..	2	300	6000	30·0	1–12 pr. Q.F. 5–6 pr.	2	65	90
FIRST CLASS—													
3 boats	Poplar.. ..	1881	86	12·5	..	1	25	400	19–20	..	4	15	
5 boats	Poplar.. ..	1881	100	12·5	..	1	35	400	18–19	4 mach.	4	15	9
Sergente Aldea ..	Poplar.. ..	1886	125	13·5	5·5	1	70	800	20	2 Q.F.	4	18	15
Injeniero Hyatt, Cirujano Videla and 4 others (Viper type)	Poplar.. ..	1896	152·6	15·3	7·9	1	140	2200	27·5-27·2	3-3 pr. Q.F.	3	28	40
Ingeniero Mutilla, Guardiamarina Contreras	Balcachuano	1898					130		25·5				
2 Unnamed	Balcachuano	Bldg.					130		25·5				
SECOND CLASS —													
Colocolo	Poplar ..	1880	45	8	..	..	5	40	16	2 mach.	2		
Tucapel	..	1880	50	9	..	..	5	40	16	2 mach.	2		
1 boat	East Cowes	1887	50	..	..	..	..	..	16				
1 boat	East Cowes	1892	60	9·6	5	1	15	270	19	..	1		

China.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
Hai Lung	Elbing ..	1898											
Hai Niu	Elbing ..	1898	193·7	21·0	..	2	280	6,000	32	6 3-pr. Q.F.	2	..	67
Hai Ching	Elbing ..	1898											
Hai Hoha	Elbing ..	1899											
FIRST CLASS—													
1 boat	Elbing ..	1886	144·3	16·4	7·5	1	128	1,400	24·2	4 1-pr. revs.	2	20	15
1 boat	Poplar.. ..	1887	128	13	5	1	69	1,000	23·9	{3 Q.F., 4 Gatlings}	3	28	15
25 boats	Stettin, &c. .	1886–87	110	13	4·9	1	65	1,000	19·5	1-pr. revs.	3	16	10
2 boats	Stettin ..	1883	86	10·4	3·4	1	28	650	18·2	1-pr. revs.	2	16	12
1 boat	Stettin ..	1884	123·5	21·7	..	..	..	..	19	..	5	16	
2 boats	Elbing ..	1895	128	15·8	..	..	120	1,250	24·5	Q.F.	2		
SECOND CLASS—													
11 boats	Elbing ..	1885–86	85	11·9	4·8	1	27	400	19	..	1	..	5
1 boat	Foochow ..	Bldg.	88·6	6·7	3·3	1	30	550	20·5				

Costa Rica.

Costa Rica has one 62-ft., 15-knot boat.

Denmark.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Hajen	Copenhagen	1896											
Havörnen	Copenhagen	1897	154·3	15·4	7·9	2	142	2,317	22·9	{1 4·7-in. 1 1-pr.}	3	..	..
Söbjörnen	Copenhagen	1898											
Delfinen	Chiswick ..	1883	111·5	12·6	6	1	59	620	20	1 mach.	2	14	9
Havhesten	Chiswick ..	1888	137·9	14	7	1	94	1,200	22·8	2 1-pr. revs.	4	20	15
Hvalrossen	Chiswick ..	1884	114	12·6	6·5	1	64	660	18·7	1 mach.	2	14	10
Makrelen	Copenhagen	1893	140	14·2	7	2	112	1,200	..	..	..	..	16
Narhvalen	Chiswick ..	1888	137·9	14	7	1	94	1,200	22·3	2 1-pr. revs.	4	20	15
Nord Kaperen.. ..	Copenhagen	1893	140	14·2	7	2	112	1,200	..	2 1-pr. revs.	4	..	16
Sölöven	Chiswick ..	1887	131	14·8	6·8	1	89	1,200	23·3	2 mach.	4	20	14
Söulven	Havre.. ..	1880	94·8	10·9	3·9	1	37	450	18·1	..	2	12	5
Springeren	Copenhagen	1891	119	13	4·9	1	81	800	18·3	2 1-pr. revs.	2	20	14
Stören	Chiswick ..	1887	131	14·8	6·8	1	89	1,200	23	2 mach.	4	20	14
Sværdfisken	Chiswick ..	1881	110	12	6	1	49	600	20·7	1 mach.	2	14	9
SECOND CLASS—													
Nos. 4, 5 (2 boats) ..	Chiswick ..	1882	63	7·5	2·5	1	15	150	16·9	1 mach.	2	6	1
Nos. 6, 7 (2 boats) ..	Chiswick ..	1884	66·8	8	4·2	1	16	170	15·4	1 mach.	2	6	1·5
Nos. 8, 9 (2 boats) ..	Chiswick ..	1886	69·5	8·1	3·8	1	17	170	15·7	1 mach.	2	6	1
Nos. 10, 11 (2 boats).	Chiswick ..	1888	70·2	8	4	1	18	180	15·8	1 mach.	2	6	1
Nos. 12, 13 (2 boats).	Chiswick ..	1889	78·3	9	4·9	1	24	350	18	1 mach.	2	8	3
1 boat	Chiswick ..	1875	58	7·5	3	1	..	..	16	..	sp.		

Four destroyers and two boats are provided for.

France.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Durandal	Havre	1898	180·5	19·5	10·6	2	300	4800	26	1-9pr. 6-3prs.	2	45	48
Hallebarde	Havre	Bldg.	180·5	19·5	10·6	2	300	4800	26	1-9pr. 6-3prs.	2	45	48
Espingole	Havre	Bldg.	183·9	19·6	10·6	2	303	4800	26	1-9pr. 6-3prs.	2	45	48
Fauconneau	Havre	Bldg.	183·9	19·6	10·6	2	303	4800	26	1-9pr. 6-3prs.	2	45	48
Pique	Havre	Bldg.	185·9	19·6	9.11	2	319	5700	26 0	1-12 prs.	2	48	33
Epée	Havre	Bldg.	185·9	19·6	9·11	2	319	5700	26.0	1-12 prs.	2	48	33
Framée	Bordeaux	Bldg.	185·9	19·6	9·11	2	319	5700	26·0	4-6 prs.	2	48	33
Yatagan	Bordeaux	Bldg.	185·9	19·6	9·11	2	319	5700	26·0	4-6 prs.	2	48	33
M 8, M 9	..	Pro.											
SEA-GOING—													
Agile	La Seyne	1889	139	14·7	7·7	2	121	1,100	20·4	3-3 prs.	2	26	14
Alarme	St. Nazaire	1889	151	15·7	8·3	2	169	1,400	20·5	2-3 prs.	4	30	40
Aquilon	Normand	1895	137·8	14·6	7·9	2	127	2,000	2.·17	2-3 prs.	2	34	17
Archer	Normand	1893	138	14·7	6·5	2	131	1,250	21	2-3 prs.	2	26	17
Argonaute	St. Denis	1893	141	16·4	9·3	2	133	1,500	25·1	2-3 prs.	2	34	16
Audacieux	..	Bldg.	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	2	..	18
Aventurier	St. Nazaire	1889	151	15·7	8·3	2	174	1,400	20·5	2-3 prs.	4	34	40
Averne	Havre	1894	141	16·4	9·3	2	133	1,500	24·4	2-3 prs.	2	27	16
Cerbère	Normand	Bldg	137·8	14·6	7·9	2	127	2,000	25·0	2-3 prs.	2	34	17
Chevalier	Normand	1893	144·3	15·7	6·8	2	134	2,700	27·2	2-1 prs.	2	32	17
Corsaire	St. Denis	1893	160·5	15	5·4	2	171	2,500	25·5	4-1 prs.	2	32	15
Coureur	Chiswick	1888	147·5	14·5	4·6	2	129	1,550	23·28	4 Nords.	2	27	22
Cyclone (ex-Tenare)	Havre	1898	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	2	..	18
Dauphin	Havre	1894	141	16·4	9·3	2	137	1,500	25·22	2-3 prs.	2	34	16
Défi	St. Nazaire	1889	151	15·7	8·3	2	173	1,400	21	2-3 prs.	4	30	40
Dragon	Normand	1892	138	14·7	8·2	2	129	1,400	25	2-3 prs.	2	26	15·5
Eclair	La Seyne	1891	144·3	14·7	7·7	2	128	1,100	21·5	3-3 prs.	2	26	17
Flibustier	Normand	1894	143	16·4	9·3	2	132	1,500	23·5	2-3 prs.	2	34	16
Forban	Normand	1895	144·2	15·2	10	2	135	3,200	31·2	2-1 prs.	2	..	..
Grenadier	Normand	1892	138	14·7	8·2	2	129	1,400	25·25	2-3 prs.	2	26	15·5
Grondeur	Havre	1892	147·5	14·5	5	2	130	1,550	24	2-3 prs.	2	27	20
Kabyle	La Seyne	1891	144·3	14·7	7·7	2	128	1,100	21·6	3-3 prs.	2	27	17
Lancier	Normand	1893	138	14·7	8·2	2	128	1,400	25·79	2-3 prs.	2	26	15·5
Lansquenet	Nantes	1893	165·4	15·8	4·2	2	150	2,800	..	2-3 prs.	..	..	..
Mangini	Nantes	1896	147·6	14·8	7·9	2	129	2,100	27·5	2-3 prs.	2	34	17
Mistral	..	Bldg.	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	2	..	18
Mousquetaire	Havre	1892	154	15·7	7	2	150	2,100	24·77	2-1 prs.	2	32	18
Orage	La Seyne	1891	144·3	14·7	7·7	2	128	1,100	21·7	3-3 prs.	2	26	17
Ouragan	Nantes	1887	151	15·7	8·3	2	174	1,400	20	2-3 prs.	4	30	40
Sarrazin	Bourdeaux	1893	139	14·7	7·7	2	131	1,100	20·5	3-3 prs.	2	26	14
Simoun	..	Bldg.	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	2	..	18
Sirocco	..	Bldg.	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	2	..	18
Temeraire	St. Nazaire	1889	151	15·7	8·3	2	174	1,400	21	2-3 prs.	4	30	40
Tourbillon	Bourdeaux	1892	139	14·7	7·7	2	131	1,100	20·5	3-3 prs.	2	26	14
Tourmente	St. Denis	1893	141	16·4	9·3	..	132	1,500	24·6	2-3 prs.	2	35	15
Trombe	..	Bldg.	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	2	..	18
Turco	St. Denis	1892	138	14·7	8·2	2	124	1,400	21·3	2-3 prs.	2	26	15·5
Typhon	..	Bldg.	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	2	..	18
Véloce	Havre	1892	147·5	14·5	5	2	130	1,550	23·6	2-3 prs.	2	27	20
Zouave	St. Denis	1892	138	14·7	8·2	2	124	1,400	21·3	2-3 prs.	2	26	15·5
N 18 to N 21	..	Pro.											
FIRST CLASS—													
Balny	Normand	1886	134·5	11	7·2	1	66	700	20	2-1 pr. rev.	2	21	12
Bouët-Willaumez	St. Denis	1888	134·5	11	7·2	1	66	700	20	2-1 pr. rev.	2	21	12
Capt. Cuny	..	1886	134·5	11	7·2	1	66	700	20	2-1 pr. rev.	2	21	12
Capt. Mehl	..	1886	134·5	11	7·2	1	66	700	20	2-1 pr. rev.	2	21	12
Challier	..	1886	134·5	11	7·2	1	66	700	20	2-1 pr. rev.	2	21	12
Deborter	St. Denis	1886	134·5	11	7·2	1	66	700	20	2-1 pr. rev.	2	21	12
Deroulède	Normand	1886	134·5	11	7·2	1	66	700	20	2-1 pr. rev.	2	21	12
Doudart de Lagrée	Normand	1886	134·5	11	7·2	1	66	700	20	2-1 pr. rev.	2	21	12
Edmond Fontaine	St. Denis	1888	134·5	11	7·2	1	66	700	20	2-1 pr. rev.	2	21	12
151 (ex G. Charmes)	La Seyne	1886	132·5	12·5	6·	1	80	560	18·8	2-1 prs.	..	23	12
126-129 (4 boats)	Normand	1888-9	118	13·2	8·6	2	79	1,250	21	2-1 prs.	2	21	10
145-149 (5 boats)	Normand	1891-3	118	13·2	8·7	2	80	1,300	23·9	2-1 prs.	2	21	10
152-154 (3 boats)	Normand	1892-	118	13·2	8·7	2	80	1,300	24·8	2-1 prs.	2	21	10
155-157 (3 boats)	Bordeaux	1893	118	13·2	8·7	2	80	1,300	23	2-1 prs.	2	21	10
158-160 (3 boats)	Cail	1893	118	13·2	8·7	2	80	1,300	23	2-1 prs.	2	21	10
161-163 (3 boats)	St. Nazaire	1892	118	13·2	8·7	2	80	1,300	23	2-1 prs.	2	21	10
164-166 (3 boats)	La Seyne	1892	118	13·2	8·7	2	79	1,300	23	2-1 prs.	2	21	10
167-169 (3 boats)	Creusot	1892	118	13·2	8·7	2	81	1,300	23	2-1 prs.	2	21	10
170, 171 (2 boats)	Normand	1893-4	118	13·2	8·7	2	80	1,300	23-2	2-1 prs.	2	21	10

France—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FIRST CLASS—*continued.*													
172, 173 (2 boats)	Normand ..	1893–4	118	13·2	8·7	2	89	1,390	23–24	2–1 prs.	2	21	10
174–176 (3 boats)	Normand ..	1893–5	118	13·2	8·7	2	94	1,390	23–24	2 1-prs.	2	21	10
177–179 (3 boats)	Havre	1893	118	13·2	8·7	2	79	1,300	23–24	2–1 prs.	2	21	10
180–187 (8 boats)	Creusot, etc.	1893–4	118	13·2	8·7	2	80	1,300	23 4	2–1 prs.	2	21	10
188–191 (4 boats)	Normand, etc.	1893–4	118	13·2	..7	..	79	..	24–2	..	2	21	10
192–194 (3 boats)	Havre, etc.	1894–5	118	13·2	8·	2	82	1,300	23·55	2–1 prs.	2	21	10
195–200 (6 boats)	Havre, etc.	1894–5	319	13·2	8·7	2	80	1,300	23·5	2 1-prs.	2	21	10
201–205 (5 boats)	Havre	1897–8	121·4	13·6	..7	2	84	1,500	23·5	2–1 prs.	2	23	10
206–211 (6 boats)	Bordeaux ..	1897–8	121·4	13·6	..	2	86	1,500	23·5	2 1-prs.	2	23	10
212–215 (4 boats)	Havre	1898–9	121·6	13·6	..	2	86	1,500	23·5	2 1-prs.	2	23	10
216–226 (11 boats) ..	Cherbourg, Toulon, etc.	Bldg.	121·6	13·6	..	2	86–	1,500	23·5	2–1 prs.	2	23	10
227–235 (9 boats)	Bordeaux, etc.	Bldg.	121·4	13·2	8·7	2	84–	1,500	23·5	2–1-prs.	2	23	10
P. 55–63 (9 boats) ..	Havre	Bldg.	121·4	13·2	3·7	2	84–	1,500	23·5	2–1 prs.	2	23	10
P. 64–74 (11 boats) ..	..	Pro.											
SECOND CLASS—													
26	..	1878	108	11	5·6	1	45	400	19	2–1 prs.	2	16	10
27	..	1878	104·4	10·6	6·1	1	44	400	19	2–1 prs.	2	16	10
28	..	1878	111·5	11	5·6	1	44	400	19	2–1 prs.	2	16	10
60–64 (5 boats)	..	1878–85	108·2	10·3	6·1	1	45	400	19	2–1 prs.	2	16	10
65, 66, 68 (3 boats) ..	..	1878–85	108·2	10·7	6·4	1	49	500	20	2–1 prs.	2	16	10
69–74 (6 boats)	..	1878–85	108·2	10·7	6·5	1	50	500	20	2–1 prs.	2	16	10
75 82, 84–109 (34 boats)	Cail, etc. ..	1885–92	114·7	10·6	6	1	54	525	20	2–1 prs.	2	16	10
111–125 (12 boats) ..	La Seyne, etc.	1885–90	114·7	10·6	6	1	54	525	20	2–1 prs.	2	16	10
130–132, 134–144 (14 boats)*	Normand, etc.	1889–90	111·5	11·4	6	1	52·8	520	21	2–1 prs.	2	16	10
THIRD CLASS—													
8, 10–16, 18, 19 (10 boats)	Various Firms in France and England.	1877–82	86	10·2	5	1	27	200–450	16–19	..	..	10	
20			87	10·8	5	1	33			..	..	10	
22, 23 (2 boats)			87·6	10·4	5·2	1	30			..	..	10	
24, 25 (2 boats)			88·5	10·4	6	1	30			..	..	10	
31, 32 (2 boats)			85·5	10·4	3·8	1	27			..	..	10	
33–36 (4 boats)			89	10·4	6	1	32			..	..	10	
37–40 (4 boats)			87	10·8	5	1	32			..	..	10	
41, 42 (2 boats)			87	10·8	6	1	33			..	..	10	
43, 44 (2 boats)			89	10·4	5·7	1	32			..	..	10	
47			87	10·8	5	1	33			..	..	10	
48			89	10·4	5·8	1	32			..	..	10	
49, 50, 53 (3 boats) ..			87	10·8	5	1	32			..	..	10	
54, 55 (2 boats)			91	10	6·1	1	32			..	..	10	
VEDETTE BOATS—													
(1 boat) (aluminium) ..	Poplar ..	1894	62·3	9·1	..	1	14	210	20·5	..	1	8	
29, 30 (2 boats)	Chiswick ..	1876	67	8·5	3·5	1	16	..	18	..	1	8	
56, 57 (2 boats)	Chiswick ..	1879	59	7·5	3·5	1	12	50	16	..	1	8	
58, 59 (2 boats)	Chiswick ..	1881	63	7·5	3·5	1	11	50	17	..	1	8	
A, B, C	Creusot ..	1894	62·4	8·9	4·9	1	15	210	16·5	..	1	9	
D, E, F, G, H, I † ..	Creusot ..	Pro.											
SUBMARINE—													
Gustave Zédé	Toulon ..	1893	131	..	..	1	266	720	14	..	1	8	
Gymnote	Mourillon ..	1888	59	5·9	5·9	1	30	60	4–6	..	..	4	
Morse	Cherbourg ..	1898	168	..	..	..	146	..	13	..	1	9	
Narval	Cherbourg ..	Bldg	111·6	12·4	..	1	106–	217	12	..	4	11	..
Q 5–10	Cherbourg .. Brest, Lorient Rochefort ..	Pro.	111·6	12·4	..	1	106	217	12	..	4	11	..

* Second-class boat No. 83 lost off Cape de la Chèvre, 1897, and No. 133 near Algiers, 1898.
† For the torpedo-transport Foudre.
Two other submarine boats are to be built out of the patriotic fund initiated by the *Matin* newspaper.

Germany.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
Division Boats—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
D 1, D 2 (2 boats)	Elbing ..	1887	180·6	21·6	9·8	2	250	1,800	19	6 1-pr. revs.	3	48	50
D 3, D 4 (2 boats)	Elbing ..	1888	184	21·8	9·6	2	300	2,000	20	4 6-pr. Q.F. 2 1-pr. revs.	3	48	90
D 5, D 6 (2 boats)	Elbing ..	1888–9	190·3	23	9·6	2	320	3,000	22½	4 6-pr. Q.F. 2 1-pr. revs.	3	48	90
D 7, D 8 (2 boats)	Elbing ..	1890	190·3	23	9·9	2	350	3,500	22½	6 Q.F.	3		
D 9	Elbing ..	1894	197·0	24·3	9·9	2	380	4,500	26	6 Q.F.	3		
D 10	Chiswick ..	1898	211·9	19·6	8·1	2	310	5,800	28·5	5 3-pr. Q.F.	3	52	80
D 11	..	Pro.	..	..	..	..	350						
First Class—													
S 1—S 65 (64 boats)*	Elbing ..	1883–92	121 / 150	15·7 / 15·6	6·7 / 6·7	..	85–88	900 / 1,600	20–22½	2 1-pr. revs.	2	..	17
S 66—S 73 (10 boats)	Elbing ..	1893	154·3	16·4	..	2	110 / 145	1,600	..	..	3		
S 74—S 81 (8 boats)	Elbing ..	1894	154·3	16·4	..	2	125	1,900	25	..	3		
S 82—S 87 (5 boats)†	Elbing ..	1897–8	158·2	16·9	9·0	2	140	2,300	26	2 1-pr. revs.	3	..	32
G 88—G 89 (2 boats)	Kiel(Germania)	1898	154·3	16·5	..	..	160	2,500	26	2 mach.	3	22	
G 90—G 97 (8 boats)	Elbing ..	Bldg.	157·5	16·9	8·9	2	155	..	25	1 Q.F., 1 m.	3	..	30
V 1, V 2 (2 boats)	Stettin ..	1884	124·6	..	..	..	75	550	..	..	2		
V 3, V 4 (2 boats)	Stettin ..	1884	..	..	..	..	90	1,000	..	..	2		
V 5—V 10 (6 boats)	Stettin ..	1884	..	..	..	..			19	..	2		
G 1,	Gaarden ..	1885	124·6	15·7	6·6	..	88	1,000	19	2 1-pr. revs.	2	17	
Y 1,	Poplar ..	1884	120	12·5	5·5	1	65	650	19	2 1-pr. revs.	2	15	25
T 1, T 2 (2 boats)	Chiswick, &c.	1884	117·7	12·5	6·2	1	80	..	20·2	2 1-pr. revs.	2	15	22
H 1,	Kiel (Howaldt)	1886	..	..	..	..	80	1,000	20	2 1-pr. revs.	2		
K 1,	Kiel(Dockyard)	1887	118·1	13·4	5·9	..	85	1,000	22	2 1-pr. revs.	..	18	
Second Class—													
W 3—W 6 (4 boats)	Bremen ..	1884	103	12·8	..	..	..	650	18·5	2 1-pr. revs.	2	14	13
3 boats	..	1893	..	..	..	..	88	..	22				
2 boats	..	1893	..	..	..	..	90	..	3				
Vedette Boats—													
13 boats	..	..	..	..	..	..	13·5	..	18				
2 boats	..	..	..	..	..	..	..	..	16				
1 boat	Chiswick ..	1884	63	8	4·3	1	..	..	15·5	1 mach.	2		

* S 41 lost 1895. † S 85 lost 1898.

Greece.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
6 boats	Stettin ..	1885	128	15·3	5·4	1	85	1,050	19	4 1-pr. revs.	..	20	[illegible]
6 boats	Poplar.. ..	1881	100	12	4·2	1	48	600	19	2 1-pr. revs.	2	12	9
4 boats	La Seyne ..	1880	72	13	5·5	1	52	225	..	..	..	..	10
5 boats	La Seyne ..	1881	89	11	3·1	1	35	500	17·5	..	..	..	5
2 boats	Poplar.. ..	1878	75	10·8	2·5	..	18	295	16·2	..	..	..	1·5
8 boats	..	..	..	..	..	..	21	..	16				
20 boats	Various ..	..	..	..	..	..	..	..	..	..	sp.	..	..

Italy.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Fulmine	Sestri (Odero)	1898	200	19·8	5·4	2	260	4,800	28	5 6-pr. Q.F.	3	..	..
Lampo, Freccia, Dardo, Strale	Elbing (Schichau)	Bldg.	196·8	21·3	5·8	2	320	6,000	30	1 12-pr. Q.F., 5 6-pr.	2		
Nembo, Turbine, Meteora, Tuono	Naples (Pattison)	Bldg.	208	19·4	6·3	2	350	6,000	30	1 12-pr. Q.F., 3 6-pr.	2		
FIRST CLASS—													
5 boats (Aquila, Sparviero, Nibbio, Avvoltoio, Falco)	Elbing ..	1888	152	17·2	7·9	2	130	2,200	26·6	2 3-pr. Q.F., 1 1-pr. Q.F., 1 1-pr. rev.	3	24	40
Nos. 78, 79 (2 boats)	Venice ..	1887	135	14	5·3	2	110	1,600	24	1 1-pr. Q.F., 1 1-pr. rev.	5	20	30
Pellicano	Sestri (Odero)	Bldg.	157·4	19	14·8	2	147	..	25	..	..	..	..
Condore	Sestri (Ansaldo)	1898	154·3	16·8	6·9	2	136	2,500	27	2 3-prs.	2	27	..
SECOND CLASS—													
Nos. 76, 77 (2 boats)	Poplar.. ..	1887	140	14	5	2	100	1,600	25	2 3-pr. Q.F., 1 1-pr. rev.	5	20	30
Nos. 84–104, 106–111 (27 boats)	Elbing and Italy ..	1887–88	127·7	15·6	6·8	1	85	1,000	22·5	2 1-pr. Q.F.	2	17	7
Nos. 112–116, 118–135 (23 boats)	Elbing and Italy ..	1889–92	127·7	15·6	6·8	1	85	1,100 / 1,200	23	..	2	17	17
No. 117	..	1895	131·2	16·4	..	1	85	1,000	..	2 1-pr. Q.F.	2	17	17
Nos. 136–146 (11 boats)	Italy	1893–94	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
Nos. 147–153 (7 boats)	Italy ..	1894–5	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
12 boats	Italy	Bldg.	131·2	16·4	7	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
Nos. 56–75 (20 boats)	Elbing and Italy ..	1885–87	127·7	15·6	6·8	1	65	1,000	22·5	2 1-pr. Q.F.	2	17	17
THIRD CLASS—													
No. 22	Poplar.. ..	1882	100	12·5	5·5	1	40	620	22	1 1-pr. rev.	2	11	10
No. 25	Poplar.. ..	1882	100	12·5	5·5	1	40	620	22	1 1-pr. rev.	2	11	10
Nos. 26–55 (30 boats)	Chiswick and Italy ..	1882–86	100	11·7	5·3	1	34	430	21·3	1 1-pr. rev.	2	11	7
Nos. 80–83 (4 boats)	Genoa.. ..	1888	101·6	..	..	1	34	430	21	1 1-pr. rev.	2	11	7
Nos. 23, 24 (2 boats)	Chiswick ..	1881	92	10·5	4·9	1	33	470	21·8	1 1-pr. rev.	2	11	7
No. 11	..	1883	..	..	..	1	31	250	..	..	..	10	
FOURTH CLASS.													
No. 1	Chiswick ..	1878	78·8	9·8	3	1	25	420	19	1 1-pr. rev.	2	10	
No. 2	Poplar.. ..	1879	86	11	4·5	1	25	420	21	..	2	10	7
Nos. 6 and 18	Chiswick ..	1883	62·4	7·5	2·5	1	13	170	17	1 1-pr. rev.	2	10	
No. 11	Chiswick ..	1883	75·6	9·9	3·8	1	16	250	19·2	1 1-pr. rev.	2	10	
SUBMARINE—													
Delfino	Spezia	1895	49·0	..	..	..	..	..	10·0	..	..	..	..

Japan.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Murakumo	Chiswick ..	1898	..	..	..	..	..	..	30·4				
Shinonome	Chiswick ..	1898											
Yugiri	Chiswick ..	1898	210·0	19·6	7·1	2	275	5,800	30	1 12-pr., 5 6-prs.	2	54	80
Shiranui	Chiswick ..	1899											
Kagero	Chiswick ..	Bldg.											
Usugumo	Chiswick ..	Bldg.											
Ikadsuchi	Poplar.. ..	1898											
Inadsuma	Poplar.. ..	1899											
Akebono	Poplar.. ..	Bldg.	220·0	20·6	..	2	..	6,000	31	1 12-pr., 5 6-prs.	2		
Suzanami	Poplar.. ..	Bldg.											
Oboro	Poplar.. ..	Bldg.											
Niji	Poplar.. ..	Bldg.											
Hayabusa..	Havre	Bldg.											
Kasasagi	Havre	Bldg.	220·0	20·6	..	2	..	6,000	31	1 12-pr., 5 6-prs.	2		
Managuru	Havre	Bldg.											
Shirabaka	Havre	Bldg.											
4 unnamed	Elbing ..	Bldg.	220·0	20·6	8·6	2	360	6,000	33	1 12-pr., 5 6-pr. Q.F.	2	56	90
Kotaka	Poplar.. ..	1886	170	19·6	5		190	1,400	19	+ mach.	6	..	
14 boats*	Creusot ..	1889	114·7	10·6	6	2	56	525	20	2 1-prs.	..	16	50
7 boats	Kobe	1889	114·7	10·6	6	1	56	525	20	2 1-prs.	..	16	
4 boats	Poplar.. ..	1879	100	12·5	..	1	40	620	20	..	..	..	
1 boat	Normand ..	1891	118	13·2	8·7	1	75	1,300	23	2 1-prs.	2	21	3
2 boats	Elbing ..	1891	128	16	..	2	90	1,300	23	3 1-prs.	3		10
10 boats	Kobe	Bldg.	..	..	..	1	..	..	..	..	..	..	24
5 boats	Havre	Bldg.	..	..	..	..	150	..	24	..	..	..	..
8 boats	Elbing ..	Bldg.	..	..	..	..	150	..	24	..	..	..	..

* No. 16 lost off the Pescadores, 1895.

The ten years' programme includes 23 first-class, 31 second-class, and 35 third-class torpedo-boats, and a 6750-ton torpedo transport.

Mexico.

Mexico has five first-class boats building or projected.

Netherlands.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Ardjoeno	Poplar.. ..	1886	125	13	6	1	83	800	21	2 1-prs.	2	16	10
Batok	Amsterdam	1887	125	13	6·9	1	83	725	20	2 1-prs.	2	16	10
Cycloop	Amsterdam	1887	125	13	6·9	1	83	680	20	2 1-prs.	2	16	10
Dempo	Amsterdam	1887	125	13	6·9	1	83	760	20	2 1-prs.	2	16	10
Empong	Poplar.. ..	1888	128	13	6·2	1	91	1,100	24·1	2 1-prs.	3	16	15
Etna	Poplar.. ..	1882	100	12·6	5·6	1	45	550	21·5	2 1-prs.	2	16	7
Foka	Amsterdam	1888	128	13	6·2	1	90	1,000	22·1	2 1-prs.	3		
Goentoer	Amsterdam	1888	128	13	6·2	1	90	950	21	2 1-prs.	3		
Habang	Amsterdam	1888	128	13	6·2	1	90	930	21·7	2 1-prs.	3		
Hekla	Poplar.. ..	1882	100	12·6	5·6	1	45	550	21·5	2 1-prs.	2	16	7
Idjen	Amsterdam	1889	128	13	6·2	1	90	840	20·6	2 1-prs.	3		
Krakatau	Amsterdam	1889	128	13	6·2	1	90	750	19·1	2 1-prs.	3		
Lamongan	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Makjan	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Noto	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
13 boats	..	pro.	160	..	..	..	..	..	..	..	..	..	..
4 boats	..	pro.	100	..	..	..	..	..	..	..	..	..	..
SECOND CLASS—													
Nos. 1, 2, 4–20 (19 boats)	Chiswick, etc.	1878–86	76 / 79	10·3	5·2	1	29	250	18	1 1-pr.	2 sp	..	3
Nos. 3,21,2 (3 boats)	..	1890	81·6	10·5	5·1	1	37	460	17·9	1 1-pr.	1	..	3
1 boat	East Cowes	1883	45·5	9·7	..	1	..	..	12	1 mach.	1		
INDIAN FLEET—													
Cerberus	Flushing ..	1888	125	13	6·9	1	83	912	21·2	2-1 prs.	2	16	
1 boat	..	1891											
3 boats	..	1893-94	125	..	..	..	83	..	21·5	..	2		

Norway.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Lyn	..	1882	94·2	9·7	2·5	1	36	430	18	..	1	..	3
Od	..	1882	97·5	11	5·6	1	40	450	18	..	1	..	3
Orm, Otter (2 boats)	..	1887	108·2	12·2	5·6	1	40	500	20	..	2	..	3
Pil, Rask (2 boats)..	..	1887	101·7	11·8	5·6	1	40	500	20	..	2	..	3
Snar	..	1887	104·9	11·8	5·6	1	40	500	20	..	2	..	3
Springer	..	1887	97·5	11·6	5·6	1	40	450	19	..	2	..	3
Varg (8), Raket (9)	Christiania..	1894	111·5	12·4	..	1	43	..	..	..	2	..	..
Hval, Delfin, Hai (3 boats)	Elbing ..	1896	128·0	15·0	..	1	84	1,100	24·5	2 1·4-in. Q.F.	2	..	..
Storm, Ovrand, Trods	Christiania ..	Bldg.	128·0	15·0	..	1	84	1,100	23	2 1·4-in. Q.F.	2		
SECOND CLASS—													
Rasp	Chiswick ..	1873	58	7·5	3·9	1	16	..	18	..	2		
Ulven	..	1878	56	..	..	1	16	..	9	..	sp.		
2 boats	..	..	..	..	..	..	20	..	12	..	..		

Portugal.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
5 boats (5–9)	Elbing ..	1890–92											
Espadarte (1)	Poplar.. ..	1881	8[illegible]	11	5	1	31	450	19·7	2 mach.	2	10	10
Nos. 2, 3, 4 (3 boats)	Poplar.. ..	1886	120	12·5	5·5	1	60	700	20	2 mach.	2	16	18
Fulminante	Blackwall ..	1880	75	15	2·6	2	40	150	11·5	2 mach.	..	..	8
1 boat	..	..	..	..	..	..	25						
Mineiro	Lisbon ..	1893	..	..	..	..	..	..	12				
SUBMARINE—													
Plongeur	..	1892	72·1	11·5	..	..	..	..	6				

Roumania.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Naluka	Havre.. ..	1888	120·7	11·3	6·9	1	55	500	21	1 1-pr. rev	2	..	12
Sborul	Havre.. ..	1888	120·7	11·3	6·9	1	..	500	21	1 1-pr. rev.	2	..	12
Smeul	Havre ..	1888	120·7	11·3	6·9	1	..	500	21	1 1-pr. rev.	2	..	12
SECOND CLASS—													
Szimul	Poplar.. ..	1882	63	8	3	1	15	150	16·5	..	..	8	1
Vulturul	Poplar.. ..	1882	63	8	3	1	15	150	16·5	..	..	8	1

Russia.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
BALTIC SEA.													
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Sokol	Poplar	1895	190	18·6	7.0	2	240	4,400	29.7	1 12-pr. 3	2	..	
Krechet, Korshun (2 boats)	Abo	1898	198·10	18·6	7·0	2	240	3,800	27·5	6-pr.	..	..	..
Iastreb	Ishora	1898	196·9	18·4	11·5	1	240	3,800	27	1 2·8-in.	2		
Nyrok	Ishora	1898	196·9	18·4	11·5	1	240	3,800	27	3 1·8-in.	2		
Berkout	Ishora	1898	196·9	18·4	11·5	1	240	3,800	27	3 1·8-in.	2		
Condor	Ishora	1898	196·9	18·4	11·5	1	240	3,800	27	3 1·8-in.	2		
3 boats	Ishora	Bldg.											
Kit, Skat, Delphin, Kassatka (4 boats)	Elbing	1898	196·9	18·4	11·5	1	350	3,800	27	3 1·8-in.	2		
Ossetr, Kephal, Losos	La Seyne	Bldg.	187·0	20·7	6·6	1	320	..	..				
Forel, Sterliad	Havre	Bldg.	..	..	..	1	312	..	..				
Gagara, Voron, Filin, Sova	Nevsky	Bldg.	..	..	..	1	312	..	..				
Som	Birkenhead	Bldg.	..	..	..	1	350	..	..				
FIRST CLASS—													
Aspen	Ishora	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Abo	Elbing	1886	128	15·7	7·5	1	87	900	22·2	4 1-pr. revs.	2	13	17
Bjerke	Putiloff	1890	136·5	13	7·8	..	81	1,100	21				
Dago	Abo	1891	152	13	8·3	..	100	1,000	19				
Domeness	Putiloff	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Eckness	Abo	1890	136·5	13	7·8	..	81	1,100	21				
Hapsal	Putiloff	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Hogland	Ishora	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Kotka	Abo	1891	152	13	8·3	..	100	1,000	19				
Kotlinj	St. Petersburg	1885	124·2	12·9	5·9	2	67	500	16·5	2 1-pr. revs.	2	16	15
Kronschlot	Ishora	1891	152	13	8·3	..	100	1,000	19				
Lachta	Elbing	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Libawa	Elbing	1886	128	15·7	7·5	1	87	1,000	22	4 1-pr. revs.	2	13	17
Louga	Elbing	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Moonsund	Putiloff	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Nargen	Ishora	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Narwa	Elbing	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Nyrok	Ishora	1898											
Pernoff	Normand	1892	138	14·7	9·9	2	118	1,000	25·4	2 mach.	2	26	
Rochensalm	Putiloff	1890	136·5	13	7·8	..	81	1,100	21				
Seskar	Ishora	1891	152	13	8·3	..	100	1,000	19				
Sestoresk	Normand	1893	118	13·2	8·7	2	130	1,900	25	2 1-prs.	2	21	16
Tosna	Putiloff	1893	127·9	15·7	6·9	1	98	1,250	21	..	2	13	17
Transund	Ishora	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Viborg	Clydebank	1886	144·5	17	8·1	2	126	1,400	20	2 3-pr. revs.	3	24	45*
Vindawa	Elbing	1886	128	15·7	7·5	1	87	900	21	4 1-pr. revs.	2	13	17
Vzriw	St. Petersburg	1877	118	16	10·9	1	160	800	14·5	4 Q.F.	1	18	16
8 boats	St. Petersburg	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
2 boats	Putiloff	1894	138	14·7	9·9	2	118	..	25	2 mach.	2	26	
2 boats	St. Petersburg	1896	128	16	6·9	2	85	1,200	22	2 1-prs.	2	13	17
6 boats	St. Petersburg	1897	138	14·7	9·9	2	120	..	25	..	2	26	
†8 boats	St. Petersburg	1898	..	..	..	..	118						
3 boats	Nicolaieff	1898											
SECOND CLASS—													
21 boats (Galka class)	Elbing and Russia	1880 &c.	74·7	8·9	5	1	30	220	16	..	2	14	3
21 boats (Woron class)	Elbing and Russia	..	66	11·1	..	1	..	260	17				
1 boat	Poplar	1888	60	8·5	3	1	16	240	17·5	..	2	..	1
BLACK SEA.													
FIRST CLASS—													
A. B. C. (3 boats)	Nicolaieff	1893	126	..	..	..	81	..	21				
Adler	Elbing	1890	152·0	17·2	7·9	2	130	2,200	27·4	2 1-prs.	3	24	40
Anakria	Elbing	1890	128·0	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Anapa	Odessa	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Aitodorj	Odessa	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Batoum	Poplar	1880	100	12·5	5·5	1	40	500	22	2 1-pr. revs.	2	12	9
D. E. (2 boats)	Sebastopol	1893	128	..	..	..	85	..	22				
Gagri	Claparède	1883	120·6	13·3	7	1	78	600	18	2 1-pr. revs.	2	13	12
Gelendshik	La Seyne	1883	122·7	12·4	6·2	1	73	560	18	2 1-pr. revs.	2	13	11
Ismail	Nicolaieff	1886	128	15·7	7·5	1	87	900	20	2 1-pr. revs.	2	13	17
Itzvar	Odessa	1891	..	..	..	..	81	1,100					
Kodor	Elbing	1886	128	15·7	7·5	1	87	900	21	4 1-pr. revs.	2	13	17
Kilia	Elbing	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Novorossisk	Elbing	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Poti	Normand	1883	124·6	11·9	6·7	1	72	570	18·5	2 1-pr. revs.	2	13	11
Reni	Elbing	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Sookhoum	Chiswick	1883	113	12·5	6	1	64	700	19.5	2 Nords.	2	13	10
Tchardak	Elbing	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Yalta	Elbing	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
3 boats	Elbing	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
4 boats	Nicolaieff	Bldg.	..	..	..	..	..	..	..	..	..	..	..

* Has received liquid fuel apparatus. † Of the Pernoff type, building on the Neva.

Russia—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
BLACK SEA—*contd.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
SECOND CLASS—													
Istcheritza	Sebastopol ..	1878	62·3	9·7	3·9	1	24	220	15	..	..	10	
Karabin	Elbing.. ..	1877	64·3	8·4	2	1	11	120	15	..	..	8	
Kefal..	Chiswick ..	1880	60·5	7·5	3·5	1	..	..	16·8	..	..	8	
Scheglensk	Sebastopol ..	1878	59·3	9·5	3·9	1	24	220	15	..	..	10	
Schehouka	Sebastopol ..	1878	59·3	9·5	3·9	1	24	220	15	..	..	10	
Scoombia	Odessa.. ..	1878	64·3	10	4	1	25	220	15	..	..	10	
Soroka	St. Petersburg	1878	62.3	9·7	3·9	1	24	220	15	..	..	10	
Soulin	..	1877	60	9·7	3·9	1	24	210	15	..	..	10	
Sultanka	Odessa.. ..	1878	64·3	10	4	1	25	220	15	..	..	10	
1 boat	Poplar	1877	75	10	..	..	..	..	..	..	..	..	
50 boats (Woron Class)	Elbing, etc.	..	66	11·1	..	1	..	260	17				
SIBERIAN FLOTILLA.													
Borgo	Abo	1890	136·5	13	7·8	..	81	1,100	21				
Forel..	..	..	71·5	6·5	3·3	1	23	220	16				
Jantchiche	Elbing.. ..	1887	128	15·7	11·5	..	87	970	19	4 1-pr. revs.	2	13	17
N.	..	1893	152·5	16·8	..	..	140	2,200	26·5	2 1-pr. revs.	3	24	40
N.	..	1893	152·5	16·8	..	..	140	2,200	26·5	2 1-pr. revs.	3	24	40
Podorosnik	..	..	71·5	6·5	3·3	1	23	220	16				
Revel	Normand ..	1886	152·3	12·3	8·1	1	96	780	22	2 Q.F.	2	23	30
Sisik	..	..	71·5	6·5	3·3	1	23	220	16				
Skorpion	..	..	71·5	6·5	3·3	1	23	220	16				
Sootchena..	Elbing.. ..	1887	128	15·7	11·5	..	87	970	19	4 1-pr. revs.	2	13	17
Sterliad	..	..	71·5	6·5	3·3	1	23	220	16				
Strauss	..	..	71·5	6·5	3·3	1	23	220	16				
Sunguri (*ex* Hogland)	Abo	1890	152	16	7·9	2	140	1,800	22				
Sweaborg	Normand ..	1886	152·3	12·3	8·1	1	96	780	19·7	2 Q.F.	..	..	30
Ussuri (*ex* Nargen)	Abo	1890	152	16	7·9	2	140	1,800	22				
2 Unnamed	Ochtenski ..	Bldg.	152	16	7·9	2	140	1,800	22				

Spain.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
*Furor .. .. .. ; †Terror	Clydebank ..	1896	220	22	5·6	2	300	6,000	28	2 12-pr. 2 6-pr. 2 1-pr.	2	67	100
Audaz .. .. .. ; Osado .. .. .. ; *Plutón .. .. .. ; Proserpina	Clydebank ..	1897	225	25·6	5·8	2	4[illegible]	7,500	30	2 14-pr. 2 6-pr. 2 1-pr.	2	70	90
FIRST CLASS—													
Acevedo	Chiswick ..	1885	117·7	12·5	6·2	1	63	660	20·1	2 mach.	2		
Ariete	Chiswick ..	1887	147·5	14·6	4·9	2	97	1,600	26·1	4 3-pr. Q.F.	2	..	25
Azor	Poplar.. ..	1887	134·5	14	6	1	108	1,600	24	4 3-pr. Q.F.	3	23	25
‡Barcelo	Normand ..	1886	126	10·9	..	..	6[illegible]	800	19·5	2 1-in. Nord.	2		
Bustamente	Normand ..	1887	126	10·9	..	..	6[illegible]	800	..	3 3-prs.	2		
Ejercito	Kiel	1887	111·5	13	3·3	..	60	1,000	25	2 mach.	2		
Habana	Chiswick ..	1887	127·5	12·5	6	1	59	730	21·3	1 mach.	2		
Halcon	Poplar.. ..	1887	134·5	14	..	1	108	1,600	24	4 3-pr. Q.F.	3	23	25
Julian Ordoñez ..	Chiswick ..	1885	117·7	12·5	6·2	1	65	660	20·1	2 1-in. Nord.	2		
Orion..	Gaarden ..	..	125	15·5	3·5	1	85	1,000	21·5	2 1-pr. revs.	2	18	16
Rayo..	Chiswick ..	1887	147·5	14·6	4·9	2	97	1,600	25·5	4 3-pr. Q.F.	2	..	25
Retamosa..	Poplar.. ..	1886	118	12·5	5·5	1	70	700	20·5	2 1-in.	2	17	20
Rigel..	Bremen ..	1883	105	12·3	3·3	1	57	..	19	1 1-pr. rev.	2	18	13
Seza	Ferrol.. ..	1885	126	..	..	..	85	..	14				
4 boats	..	Bldg.	147	43.0	5	..	9[illegible]	1,600	25			25	25
2 boats	Clydebank ..	Bldg.	..	..	..	..	..	..	28				
SECOND CLASS—													
Aire	Spain	1883	43·4	10·2	3	2	25	175	8	1 3·1-in.	..	16	1
Castor	La Seyne ..	1878	76·2	9·7	2·3	..	23	265	19	..	..	14	1·5
Pollux	Poplar.. ..	1879	84·5	10·7	4·6	..	33	450	19·5	..	2	14	9
VEDETTE BOATS—													
3 boats	East Cowes	1892	60	9·3	..	..	..	..	18·3				
Peral..	Carraca ..	1889	70	8·5	..	2	87	60	10				

* Destroyed in the battle of Santiago, May 3, 1898. † Damaged by the St. Paul off San Juan, Puerto Rico, June 1898.
‡ Captured by the Americans in the Philippines.

Sweden.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
First Class—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
3 boats (3, 5, 7) ..	Stockholm ..	1886	114·4	12·4	6·4	1	60	600	18	1 mach.	2	12	15
Hugin (1)	Chiswick ..	1884	113	12·5	6·2	1	65	620	19·2	1 mach.	2	12	11
Nos 9 (Gondul), 11 (Gudur)	..	1893	128	13·10	7·0	1	70	850	18	2 mach.	2		
Komet	Elbing ..	1896	128	15·9	6·4	1	90	1,056	23	2 3-prs.	2		
Blixt..	Elbing ..	1898	128	15·9	6·4	1	90	1,056	23	2 3-prs.	2		
Stjerna	Elbing ..	1898	128	15·9	6·4	1	90	1,056	23	2 3-prs.	2		
Meteor	Elbing ..	1898	128	15·9	6·4	1	90	1,056	23	2 3-prs.	2		
Orkan	Elbing ..	Bldg.	128	15·9	6·4	1	90	1,056	23	2 3-pr.	2		
Bris	Elbing ..	Bldg.	128	15 9	6·4	1	90	1,056	23	2 1-pr.	2		
Vind	Elbing ..	Bldg.	128	15·9	6·4	1	90	1,056	23	2 1-pr.	2		
Second Class—													
Agda (77)	Carlskrona..	1891	100·4	11·3	5·8	1	40	450	19	1 mach.	2	12	7·5
Agne (75)	Stockholm ..	1891	100·4	11·3	5·8	1	40	450	19	1 mach.	2	12	7·5
Blink (61)	Stockholm ..	1882	91·5	11·7	5·2	1	34	350	16	..	1	10	8
Blixt (63)..	..	1883	100·4	11·6	5·4	1	40	360	18	..	2	12	7
Bygve (71)	Stockholm ..	1889	103·2	11·6	5·8	1	41	360	18	..	2	12	9
Bylgia (73)	Stockholm ..	1889	103·2	11·6	5·8	1	41	360	18	..	2	12	9
Galdr (65)	Stockholm ..	1885	100·4	11·6	5·4	1	40	425	18·5	..	2	12	7·5
Narf (67)..	Stockholm ..	1886	101·2	11·6	5·7	1	40	450	19	..	2	12	7·5
Nörve (69)	Stockholm ..	1886	101·2	11·6	5·7	1	40	450	19	..	2	12	7·5
Rolf	Stockholm ..	1892	91·5	11·7	5·2	1	34	390	17	..	1	10	8
Seid	Chiswick ..	1882	100	12	5	1	40	360	20·7	1 mach.	2	12	8
Third Class—													
Nos. 143, 145, 147, 149, (4 boats)	Stockholm ..	1879–90	55	10·7	4·1	2	21	80	10	..	2	..	1·5
Glimt (101)	Chiswick ..	1875	58	7·6	3	1	5	60	18	..	2	..	1·5

Turkey.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
Destroyers—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Berk-Efshan	Gaarden ..	1894	187	21·6	..	2	270	200	25	6 1-pr. revs.	2		
Tajjar	Gaarden ..	1894	187	21.6	..	2	270	..	25	6 1-pr. revs.	2		
First Class—													
Edjder (No. 10) ..	Gaarden ..	1890	152·7	18·9	7·4	2	150	2,200	23	5 3-prs. Q.F.	2		
1 boat	Constantinople	1889	140	16	6·9	2	120	1,800	23	5 1-pr. revs.	2		
5 boats	Gaarden ..	1889–90	126·7	15·4	8·6	1	85	1,300	22	2 1-pr. revs.	2	21	8
Timsah	London ..	1887	126	15	..	..	..	..	21·7				
5 boats	Elbing ..	1886	120·3	16·2	..	..	85	900	21	2 Nords.	2	20	10
4 boats	Constantinople	1886–89	100·3	11·8	5·5	1	42	550	19·5	2 mach.			
Tewfik	Normand ..	1885	100·7	13	5·5	1	42	550	20				
2 boats	La Seyne and Constantinople	1885	100·7	13	5·5	1	42	550	20·3	2 Nords.			
2 boats	Teddington	1887	124	15	..	..	..	..	22				
2 boats	Kiel	1892	127	..	..	..	..	..	22				
Submarine—													
Abdul Hamid	Chertsey ..	1886	100	12	..	3	160	250	10	2 mach.	1	..	8
Abdul Medjid	Chertsey ..	1886	100	12	..	3	160	250	10	2 mach.	1	..	8

United States.

Name.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament. Guns.	Armament. Torpedo Tubes.	Complement.	Maximum Coal Capacity.
DESTROYERS—		Bldg.	ft. in.	ft. in.	ft. in.		Tons.		Knots.				Tons.
Bainbridge ..	Philadelphia	1900	245 0	23 7	6 6	2	420	8,000	29	2 12-pr., 5 6-pr.*	2	64	139
Barry	Philadelphia	1900	245 0	23 7	6 6	2	420	8,000	29	2 12-pr., 5 6-pr.	2	64	1[illegible]9
Chauncey	Philadelphia	1900	245 0	23 7	6 6	2	420	8,000	29	2 12-pr., 5 6-pr.	2	64	139
Dale	Richmond ..	1900	245 0	23 7	6 6	2	420	8,000	28	2 12-pr., 5 6-pr.	2	64	1[illegible]9
Decatur	Richmond ..	1900	245 0	23 7	6 6	2	420	8,000	28	2 12-pr., 5 6-pr.	2	64	139
Hopkins.. ..	Wilmington	1900	244 0	24 6	6 0	2	408	7,200	29	2 12-pr., 5 6-pr.	2	64	150
Hull	Wilmington	1900	244 0	24 6	6 0	2	408	7,200	29	2 12-pr., 5 6-pr.	2	64	150
Lawrence.. ..	Weymouth, Mass. ..	1900	242 3	22 3	6 2	2	400	8,400	30	2 12-pr., 5 6-pr.	2	64	115
Macdonough ..	Weymouth, Mass. ..	1900	242 3	22 3	6 2	2	400	8,400	30	2 12-pr., 5 6-pr.	2	64	115
Paul Jones ..	San Francisco	1900	245 0	23 7	6 6	2	420	7,000	29	2 12-pr., 5 6-pr.	2	64	139
Perry	San Francisco	1900	245 0	23 7	6 6	2	420	7,000	29	2 12-pr., 5 6-pr.	2	64	139
Preble	San Francisco	1900	245 0	23 7	6 6	2	420	7,000	29	2 12-pr., 5 6-pr.	2	64	139
Stewart	Morris Heights	1900	245 0	23 7	[illegible] 6	2	420	8,000	29	2 12-pr., 5 6-pr.	2	64	139
Truxtun	Baltimore ..	1900	248 0	23 3	6 0	2	433	8,300	30	2 12-pr., 5 6-pr.	2	64	232
Whipple . ..	Baltimore ..	1900	248 0	23 3	6 0	2	433	8,300	30	2 12-pr., 5 6-pr	2	64	232
Worden	Baltimore ..	1900	248 0	23 3	6 0	2	433	8,300	30	2 12-pr., 5 6-pr.	2	64	232
Bagley	Bath	Bldg.	157 0	17 0	4 7	2	167	..	28	3 3-pr.	3	29	..
Bailey	Morris Heights	Bldg.	205 0	19 0	6 0	2	23[illegible]	5,000	30	4 6-pr.	2	..	20
Barney	Bath	Bldg.	157 0	17 0	4 7	2	167	..	28	3 3-pr.	3	29	..
Biddle	Bath	Bldg.	157 0	17 0	4 7	2	167	..	28	3 3-pr.	3	29	..
Blakely	Boston ..	Bldg.	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
De Long	Boston ..	Bldg.	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Du Pont	Bristol, R.I.	1897	175 0	17 8	4 8	2	165	3,400	28·58	4 1-pr.	3	32	76
Farragut	San Francisco	1898	213 6	20 8	6 0	2	273	5,000	30	4 6-pr.	2	..	76
Foote..	Baltimore ..	1896	160 0	16 1	5 0	2	142	..	24·5	3 1-pr.	3	24	44
Goldsborough ..	Portland, Ore.	Bldg.	194 8	20 5	5 0	2	247·5	..	30	4 6-pr.	2	..	131
Nicholson ..	Elizabethport	Bldg.	174 6	17 0	4 6	2	174	..	26	3 3-pr.	3	29	..
O'Brien	Elizabethport	Bldg.	174 6	17 0	4 6	2	174	..	26	3 3-pr.	3	29	..
Porter	Bristol, R.I.	1896	175 0	17 8	4 8	2	165	..	28·63	4 1-pr.	3	32	76
Rodgers	Baltimore ..	1896	160 0	16 1	5 0	2	142	2,000	24·5	3 1-pr.	3	24	44
Rowan	Seattle, Wash.	1898	170 0	17 0	5 11	2	182	3,200	26	4 1-pr.	3	32	60
Shubrick	Richmond ..	Bldg.	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Stockton	Richmond ..	Bldg.	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Stringham ..	Wilmington	Bldg.	225 0	22 0	6 6	2	340	7,200	30	7 6-pr.	2	..	120
Thornton	Richmond	Bldg.	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Tingey	Baltimore ..	Bldg.	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Wilkes	Morris Heights	Bldg	175 0	17 6	4 8	2	165	3,000	26·25	3 3-pr.	3	29	70
Winslow	Baltimore ..	1897	160 0	16 1	5 0	2	142	2,000	24·5	3 1-pr.	3	24	44
SEA-GOING—													
Cushing	Bristol, R.I.	1890	138 9	14 3	4 11	2	105	1,720	22·5	3 1-pr.	3	23	36
Davis	Portland, Ore.	1898	146 0	15 4	5 4	2	132	1,750	22.5	3 1-pr.	3	..	..
Dahlgren	Bath	1898	147 0	16 4	4 7	2	146	4,200	30·5	4 1-pr.	2	..	32
Ericsson	Dubuque, Iowa	1894	149 7	15 6	4 9	2	120	1,800	24	4 1-pr.	3	23	35
Fox	Portland, Ore.	1898	146 0	15 4	5 4	2	132	1,750	22·5	3 1-pr.	3	..	..
Manly	Yarrow ..	..	..	..	..	..	..	..	..	..	..	..	..
Morris	Bristol, R.I.	1898	138 3	15 6	4 1	2	105	1,750	24	3 1-pr.	3	..	28
Somers	Schichau, Elbing ..	..	149 3½	17 5	..	2	145	..	..	..	..	..	..
T. A. M. Craven	Bath	1898	147 0	16 4	4 7	2	146	4,200	30·5	4 1-pr.	2	..	32
THIRD CLASS—													
Gwin..	Bristol, R.I.	1897	99 6	12 6	3 3	1	46	850	20·88	1 1-pr.	2	..	8
Mackenzie ..	Philadelphia	1898	99 3	12 9	4 3	1	65	850	20	1 1-pr.	2	..	15·3
McKee	Philadelphia	1898	99 3	12 9	4 3	1	65	850	19·82	2 1-pr.	2	..	..
Talbot	Bristol, R.I.	1897	99 6	12 6	3 3	1	46	850	21·15	1 1-pr.	2	..	8·8
Stiletto (wood)	Bristol, R.I.	..	88 6	11 0	3 0	1	31	359	18·22	..	2	..	4
SUBMARINE—													
Plunger	Baltimore ..	1898	85 3	11 6	..	2	168	1,200	8	..	1	..	..

* Guns of Destroyers of this class are Driggs Semi-Automatic Quick-Firers.

The Barcelo and some other Spanish torpedo-boats were captured during the war.

The programme of 1898 included 16 destroyers and 12 sea-going boats.

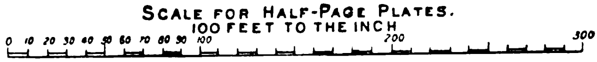
PLANS

OF

BRITISH AND FOREIGN SHIPS.

SCALE FOR FULL-PAGE PLATES
50 FEET TO THE INCH.

SCALE FOR HALF-PAGE PLATES.
100 FEET TO THE INCH

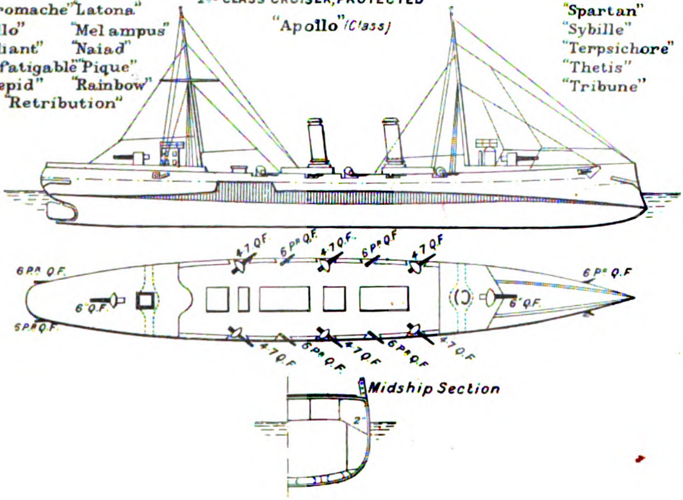


GREAT BRITAIN.

2ND CLASS CRUISER, PROTECTED

"Apollo" (Class)

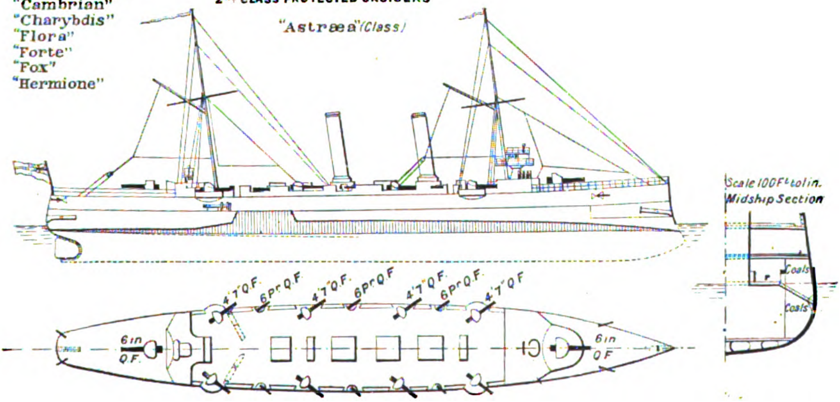
"Æolus"
"Andromache"
"Apollo"
"Brilliant"
"Indefatigable"
"Intrepid"
"Iphigenia"
"Latona"
"Melampus"
"Naiad"
"Pique"
"Rainbow"
"Retribution"
"Sappho"
"Scylla"
"Sirius"
"Spartan"
"Sybille"
"Terpsichore"
"Thetis"
"Tribune"



2ND CLASS PROTECTED CRUISERS

"Astræa" (Class)

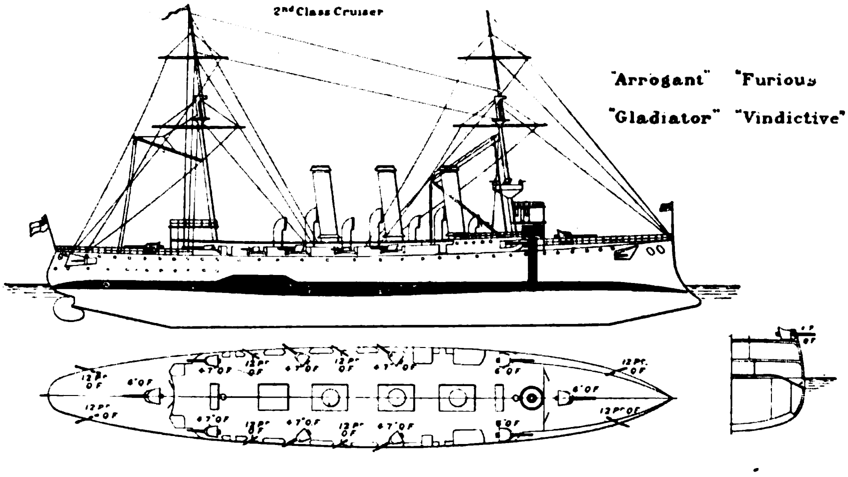
"Astræa"
"Bonaventure"
"Cambrian"
"Charybdis"
"Flora"
"Forte"
"Fox"
"Hermione"



GREAT BRITAIN

"Arrogant" Class.

2nd Class Cruiser



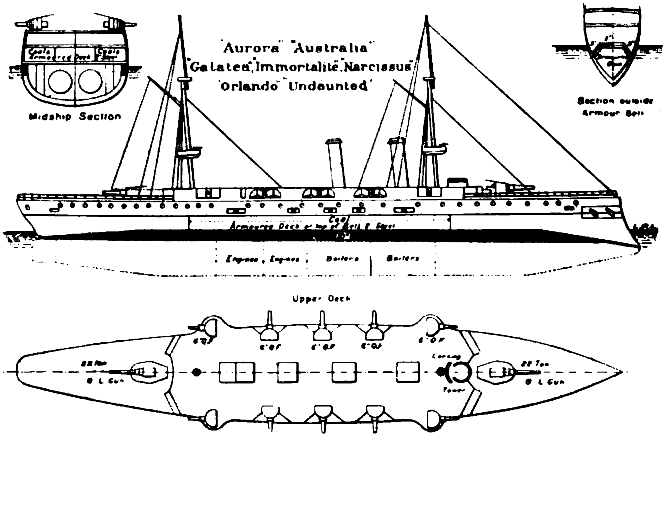
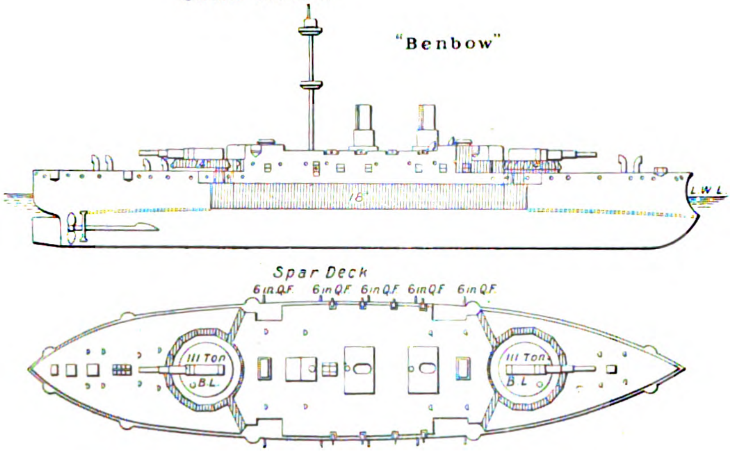


Plate 2.

GREAT BRITAIN



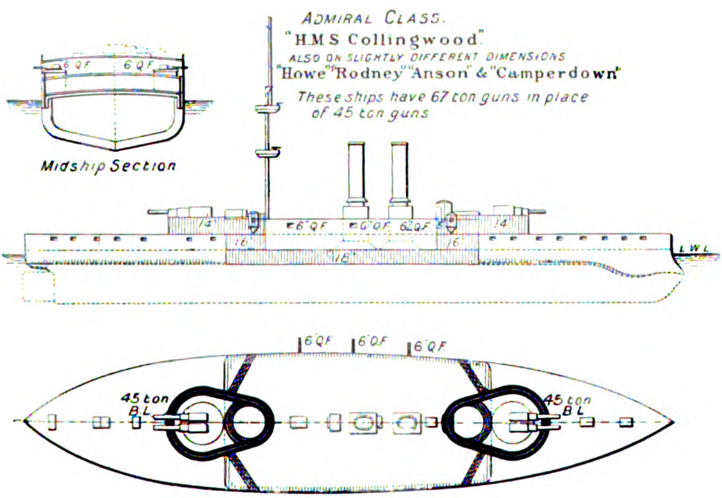
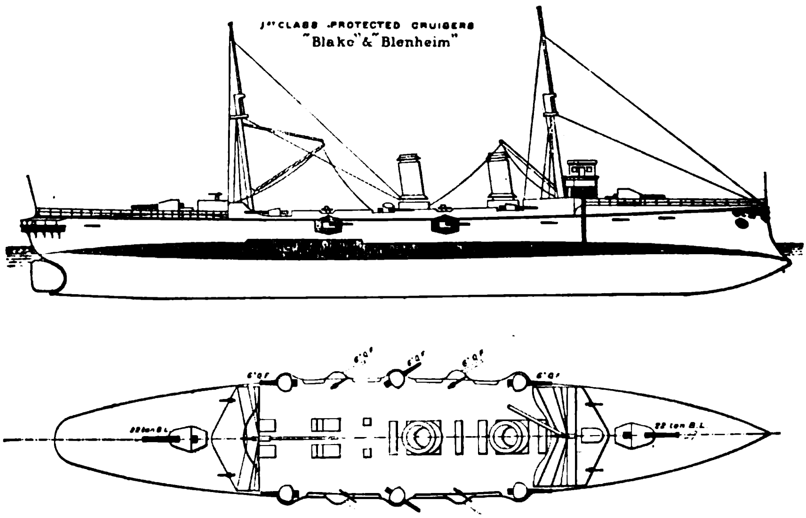
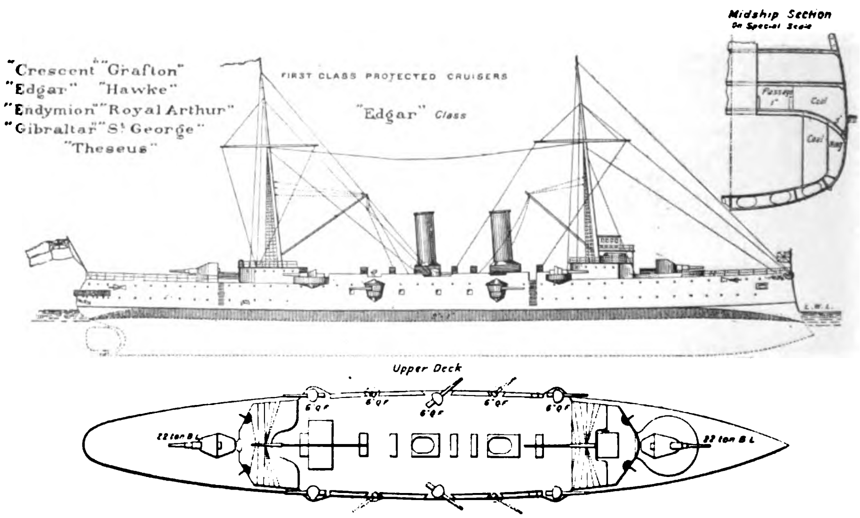


PLATE 3.

b 2.

GREAT BRITAIN





Note. *The Crescent and Royal Arthur have two 6 in guns forward in place of the 22 ton gun.*

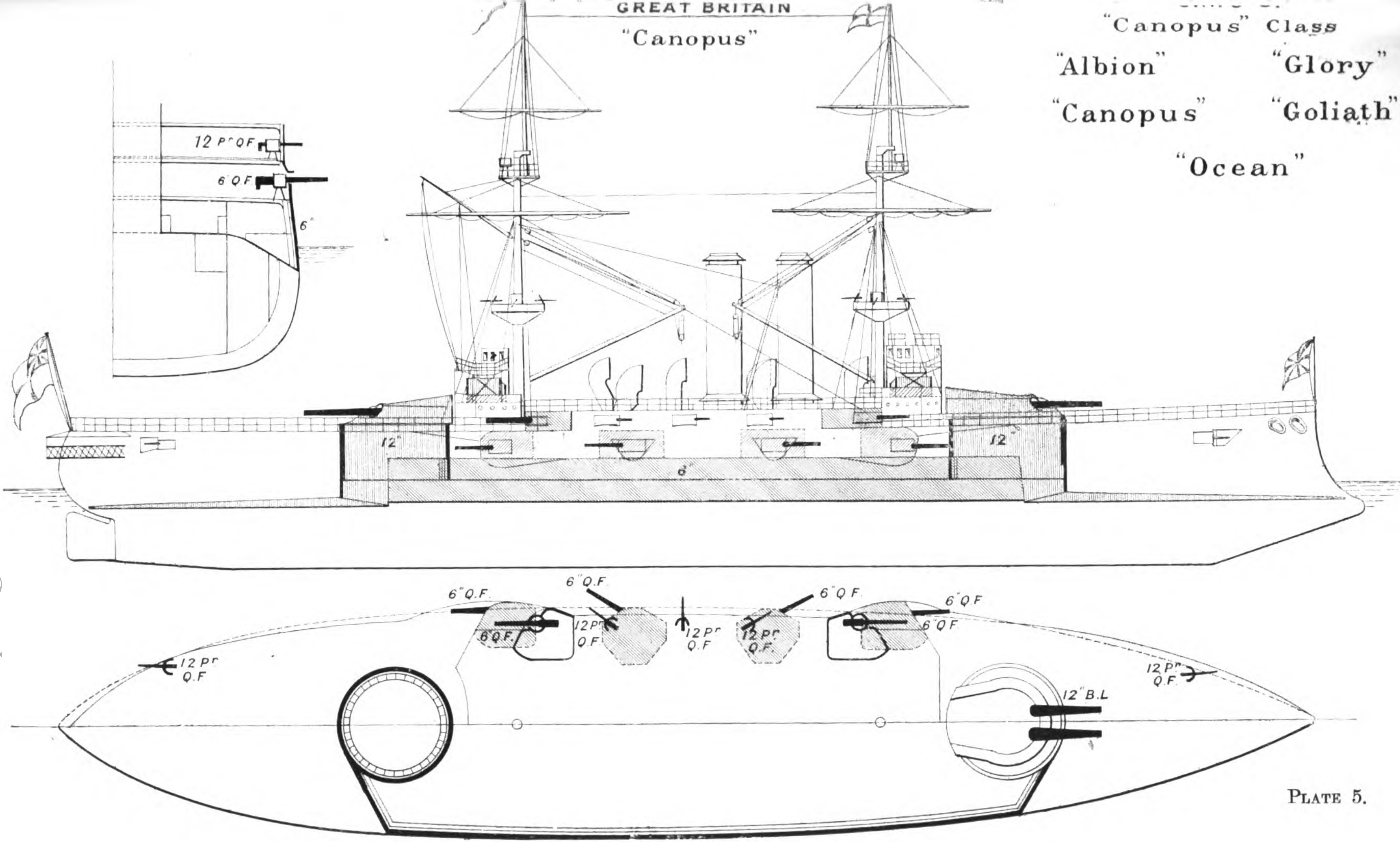

GREAT BRITAIN
"Canopus"
"Canopus" Class
"Albion" "Glory"
"Canopus" "Goliath"
"Ocean"
12 Pr QF
6 QF
6"
12"
6"
12"
6" Q.F.
6" Q.F.
6 Q.F.
12 Pr Q.F.
12 Pr Q.F.
12 Pr Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
12 Pr Q.F.
12" B.L
12 Pr Q.F.

PLATE 5.

CREAT BRITAIN

FIRST CLASS BATTLE SHIPS

"Centurion" & "Barfleur"

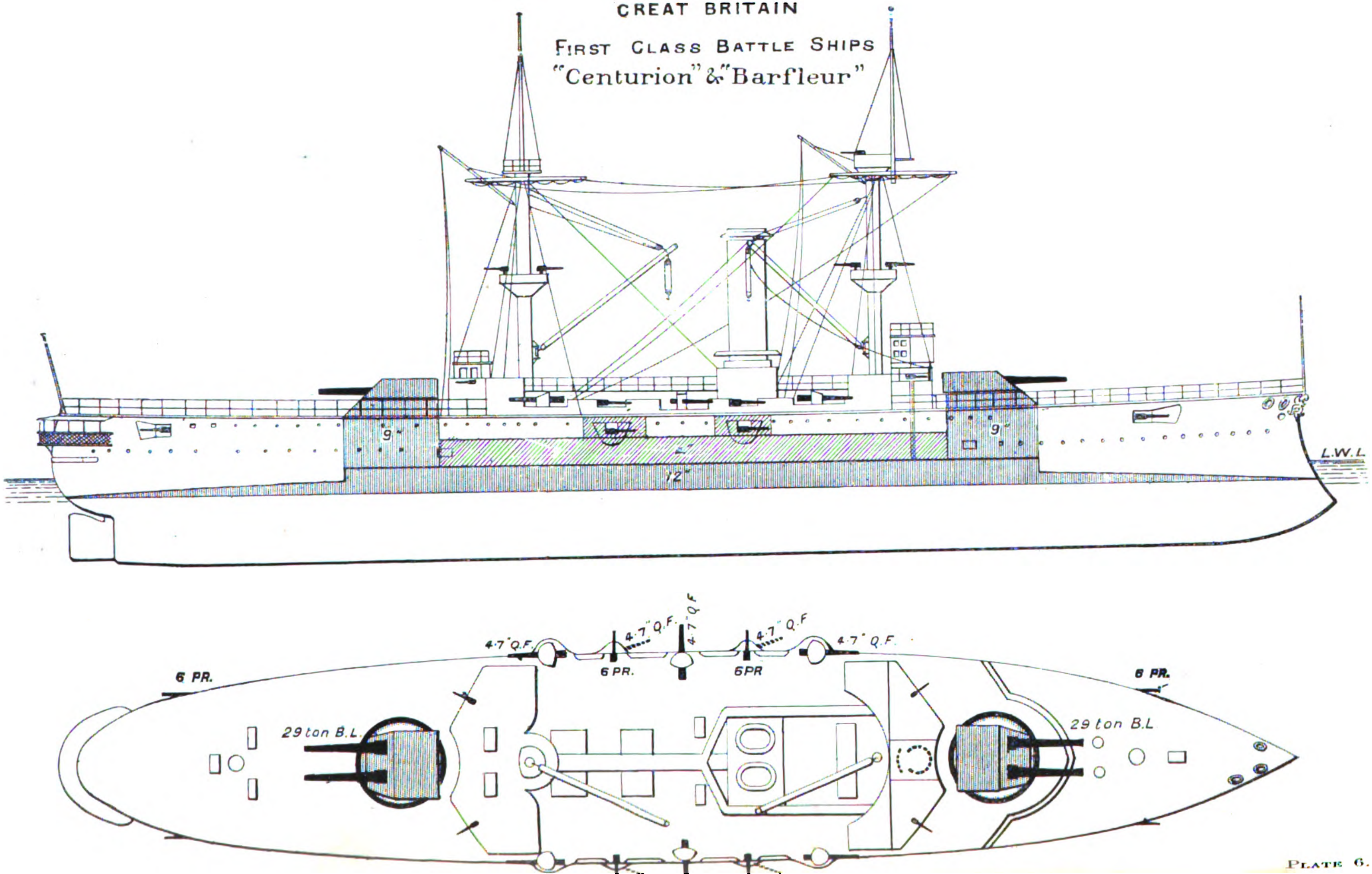
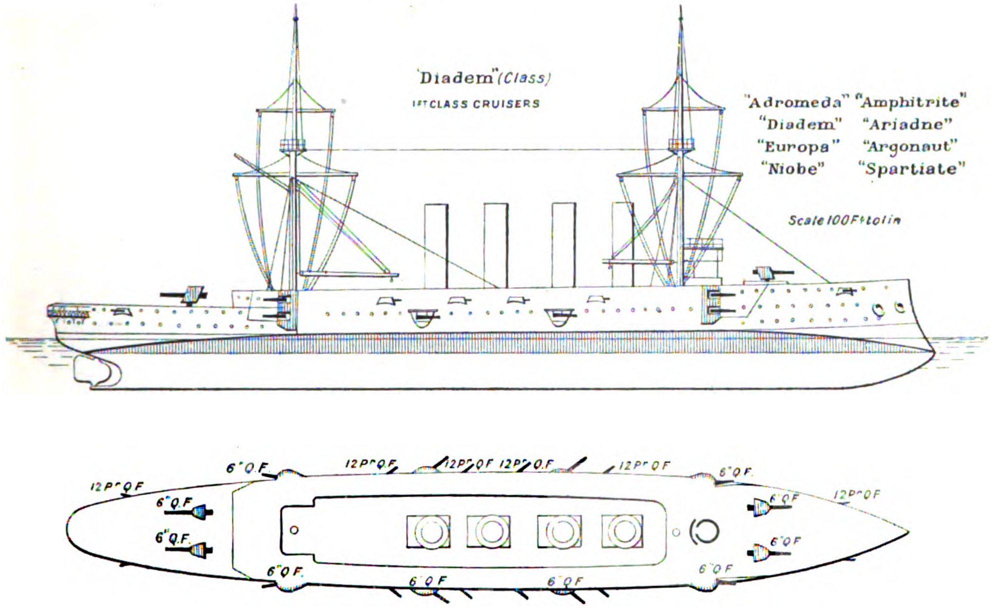


PLATE 6.

CREAT BRITAIN



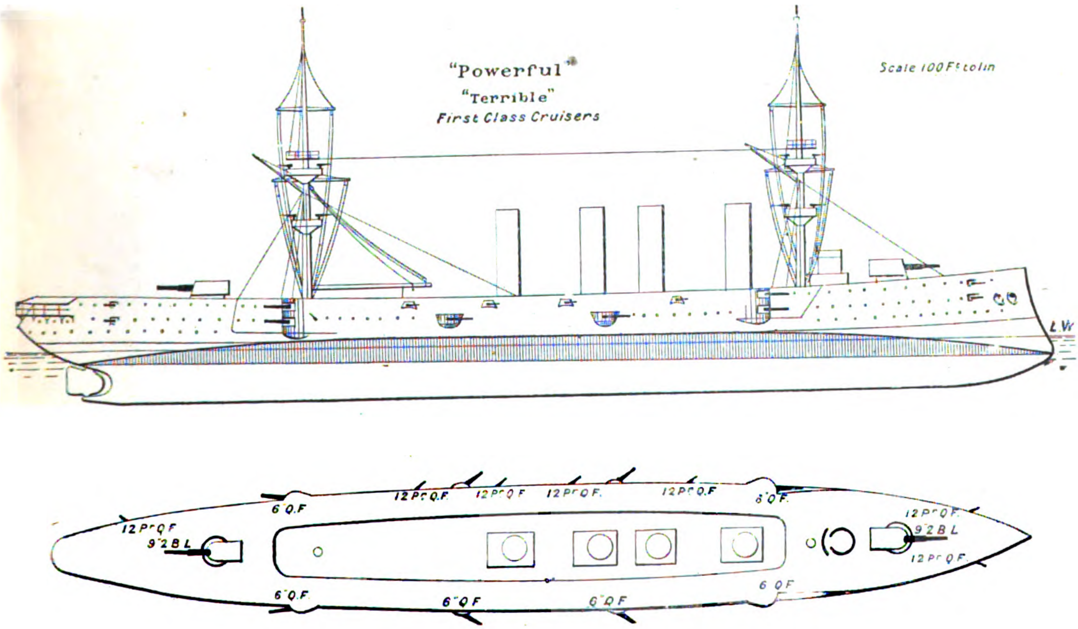


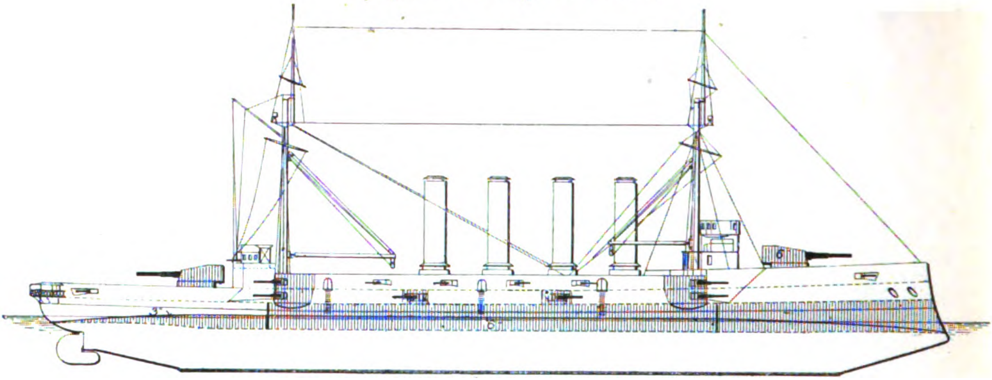
PLATE 7.

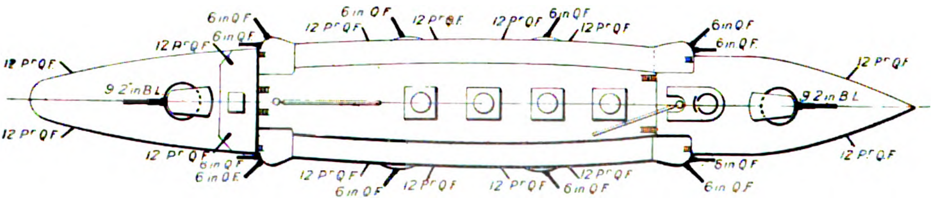
GREAT BRITAIN

First Class Armoured Cruisers of the

"CRESSY" CLASS

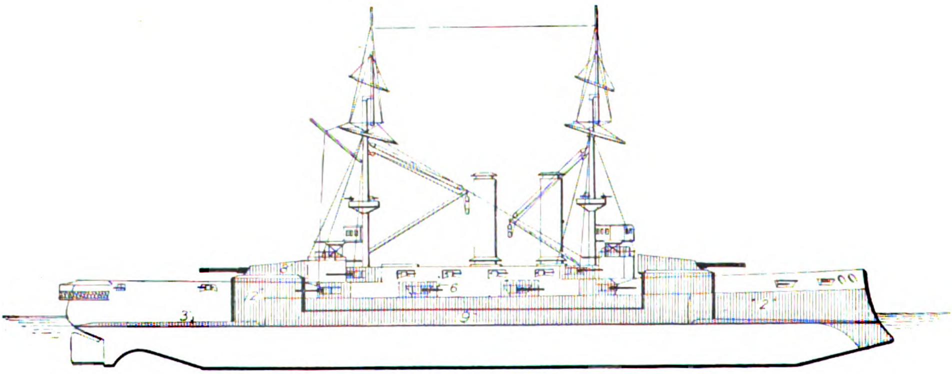
"Cressy", "Aboukir", "Hogue",
"Euryalus", "Sutlej", "Bacchante"





"FORMIDABLE" CLASS

"Formidable", "Irresistible", "Implacable",
"Bulwark", "London", "Venerable"



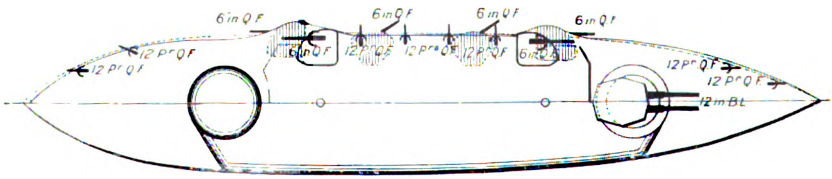
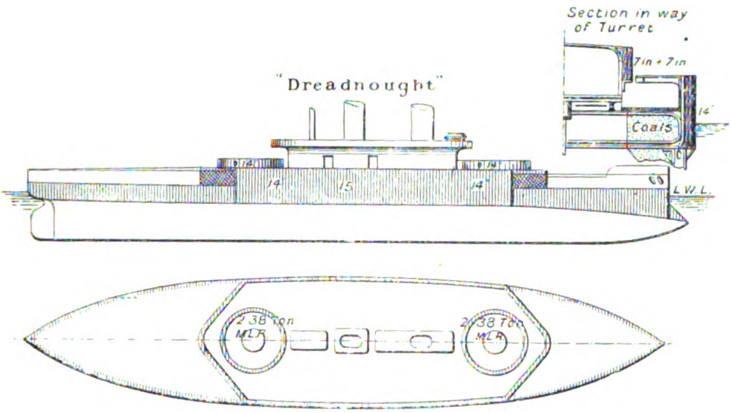


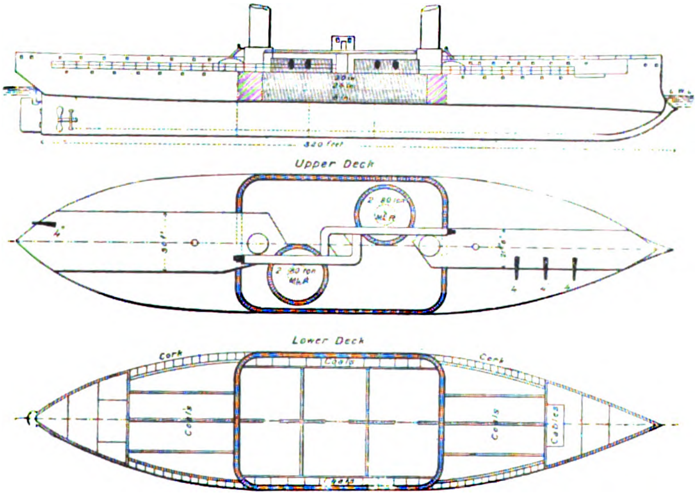
Plate 8.

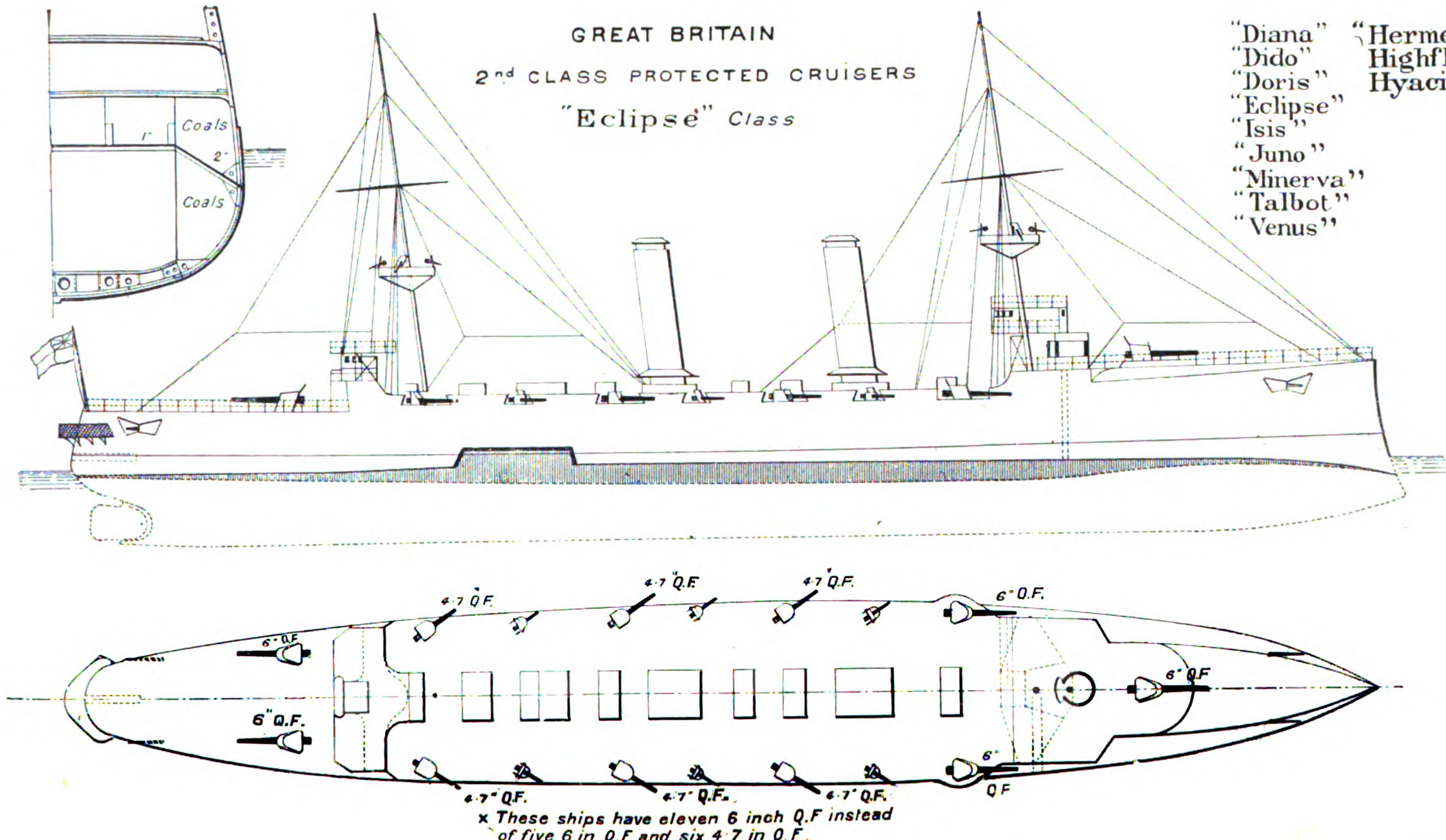
GREAT BRITAIN

"Dreadnought"



"Inflexible"




GREAT BRITAIN
2nd CLASS PROTECTED CRUISERS
"Eclipse" Class
"Diana"
"Dido"
"Doris"
"Eclipse"
"Isis"
"Juno"
"Minerva"
"Talbot"
"Venus"
"Hermes ×
Highflyer ×
Hyacinth ×
Coals
Coals
1"
2"
6" Q.F.
4·7" Q.F.
× These ships have eleven 6 inch Q.F instead of five 6 in Q.F and six 4·7 in Q.F.

GREAT BRITAIN

"Hood"

TURRET SHIP WITH REDOUBTS

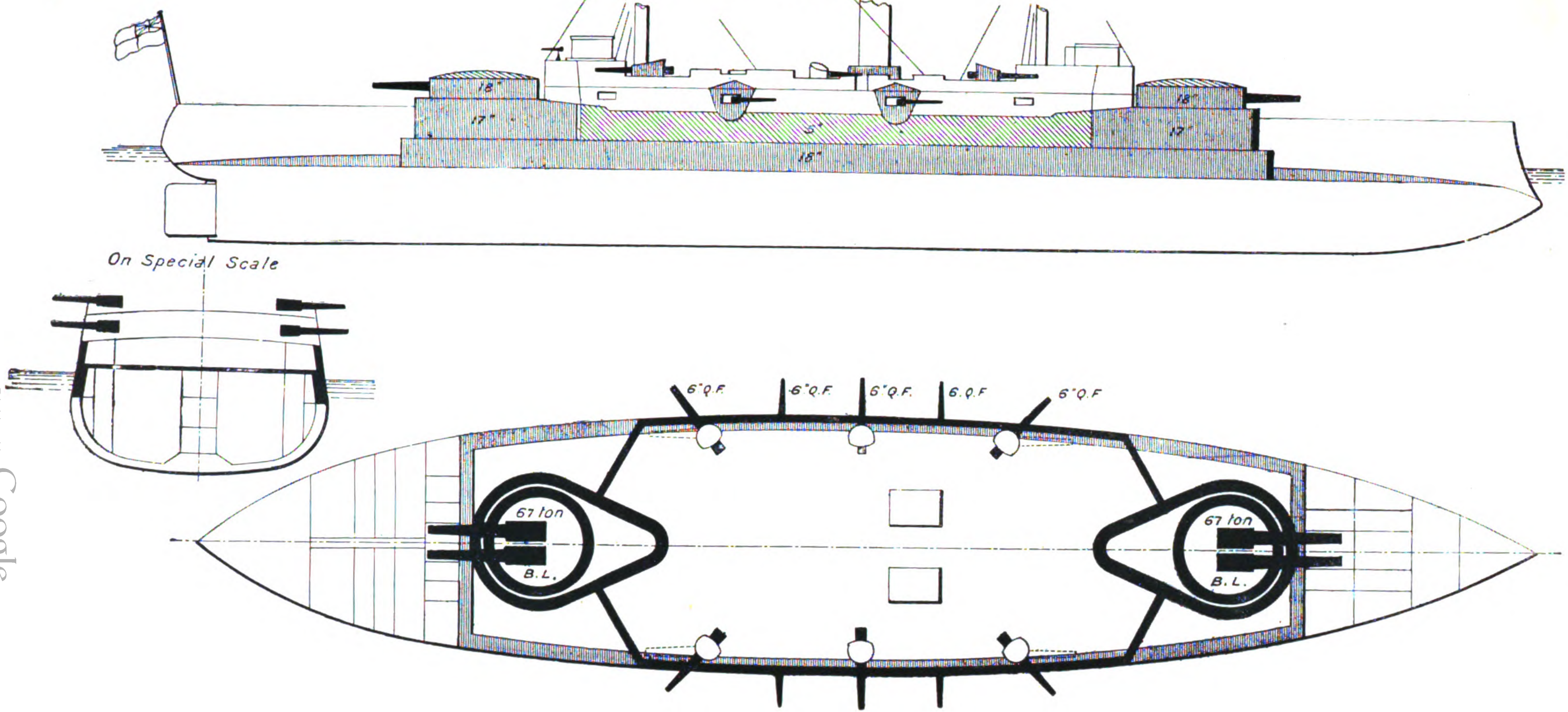


PLATE 11.

GREAT BRITAIN

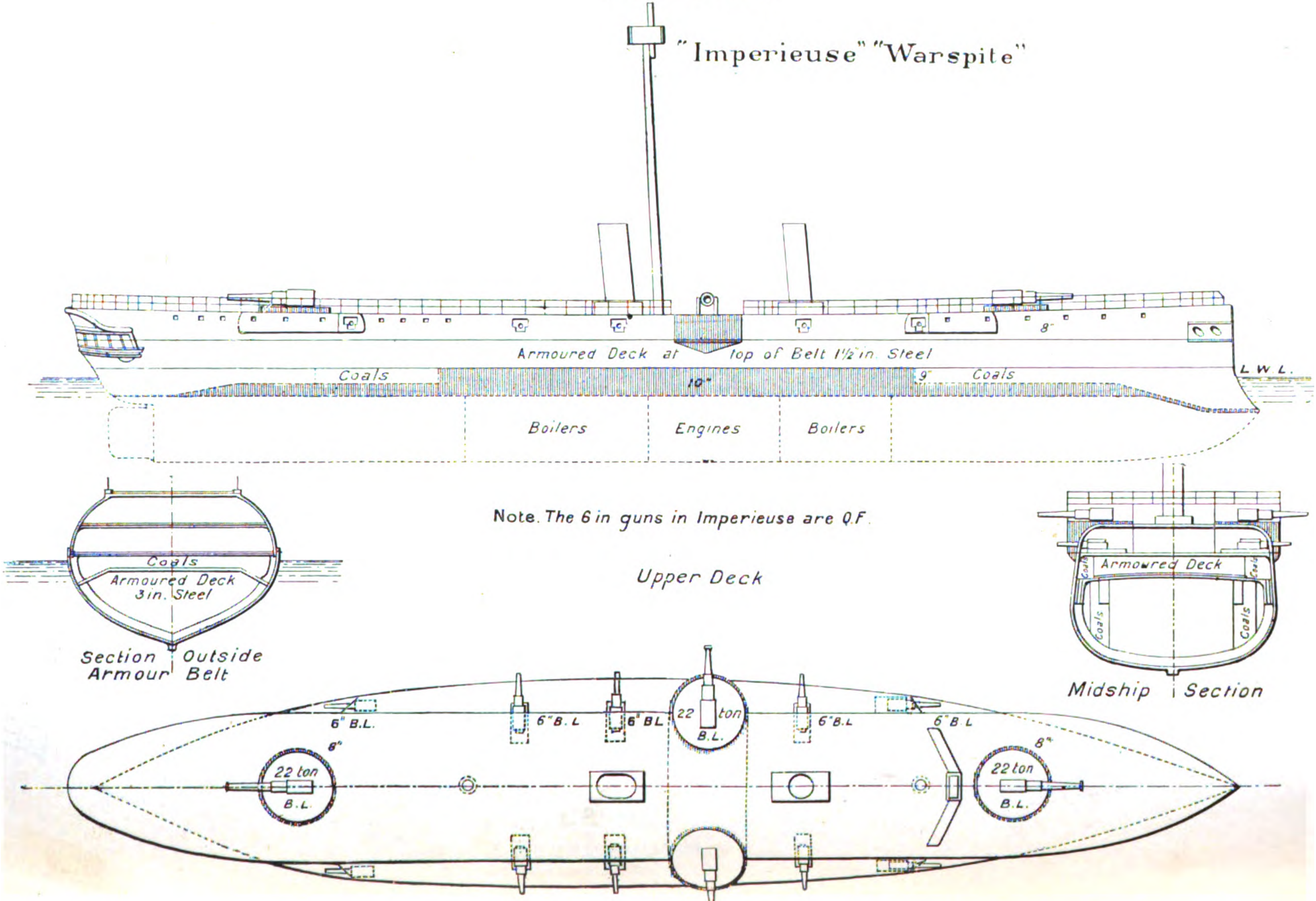
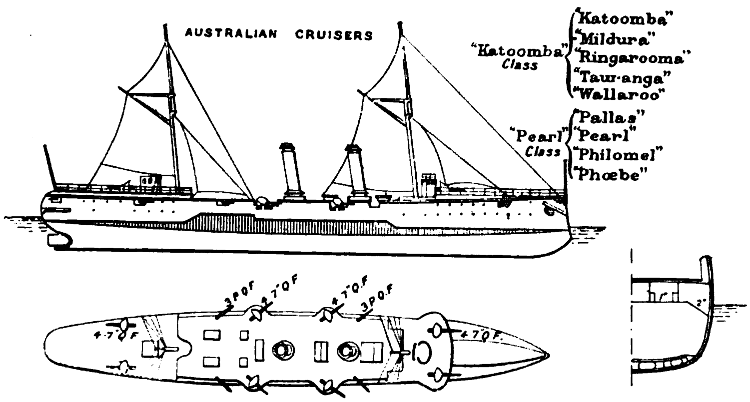


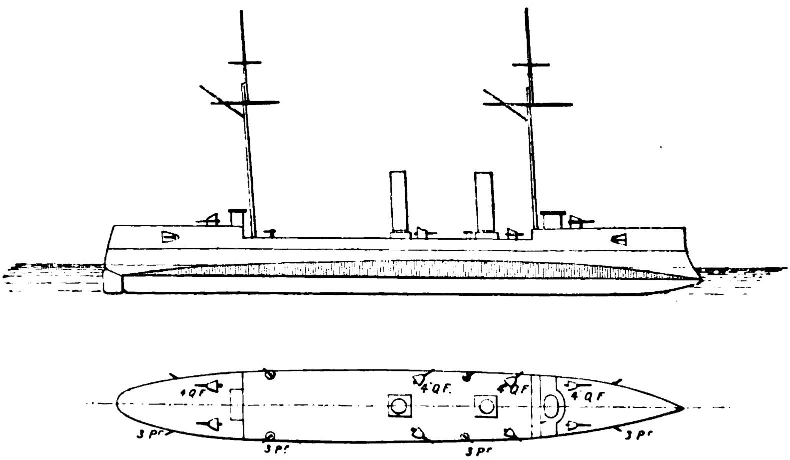
PLATE 1!

GREAT BRITAIN



Pelorus Class

Pelorus. *Pomone.*
Pactolus. *Prometheus*
Pegasus *Prosarpine.*
Perseus *Pyramus.*
Pandora *Psyche*
Pioneer



GREAT BRITAIN

"Majestic"

"Majestic" Class

"Majestic" "Victorious"
"Magnificent" "Mars"
"Hannibal" "Illustrious"
"Prince George" "Cœsar"
"Jupiter"

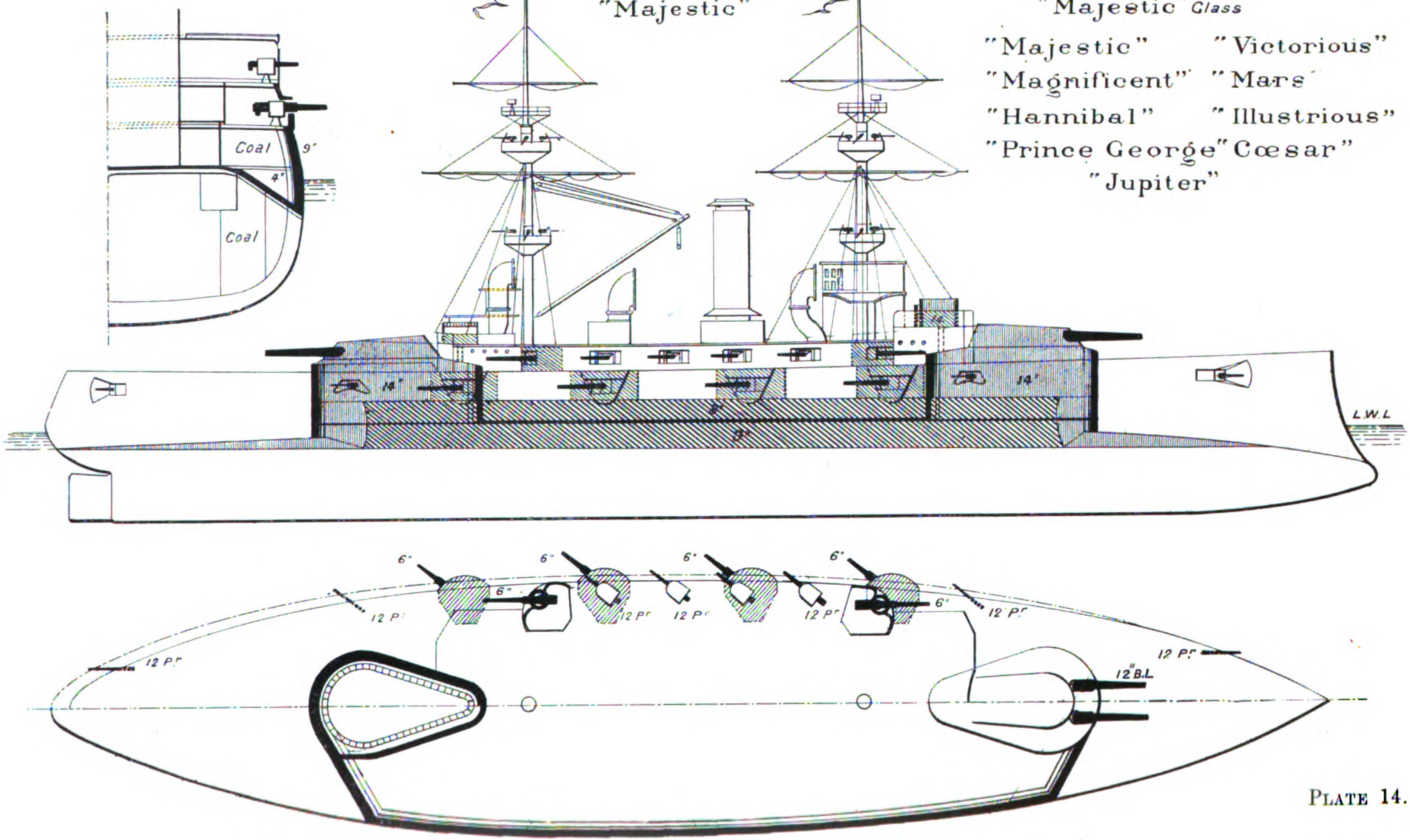


Plate 14.

GREAT BRITAIN

FIRST CLASS BATTLESHIP

" Renown "

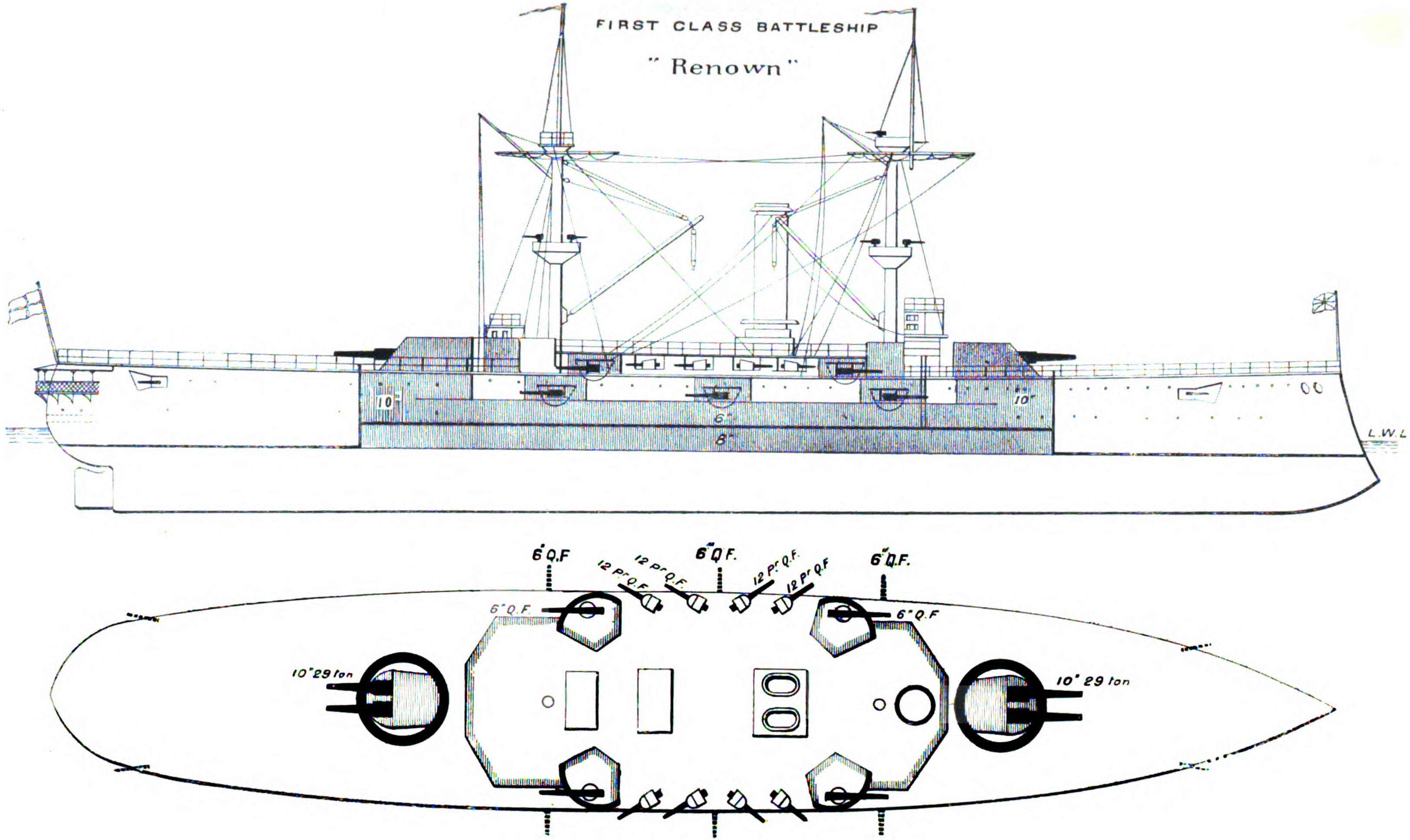


PLATE 15.

GREAT BRITAIN

"Royal Sovereign" Class

14.150 tons 13.000. I. H. P

"Empress of India"
"Ramillies"
"Repulse"
"Resolution"
"Revenge"
"Royal Oak"
"Royal Sovereign"

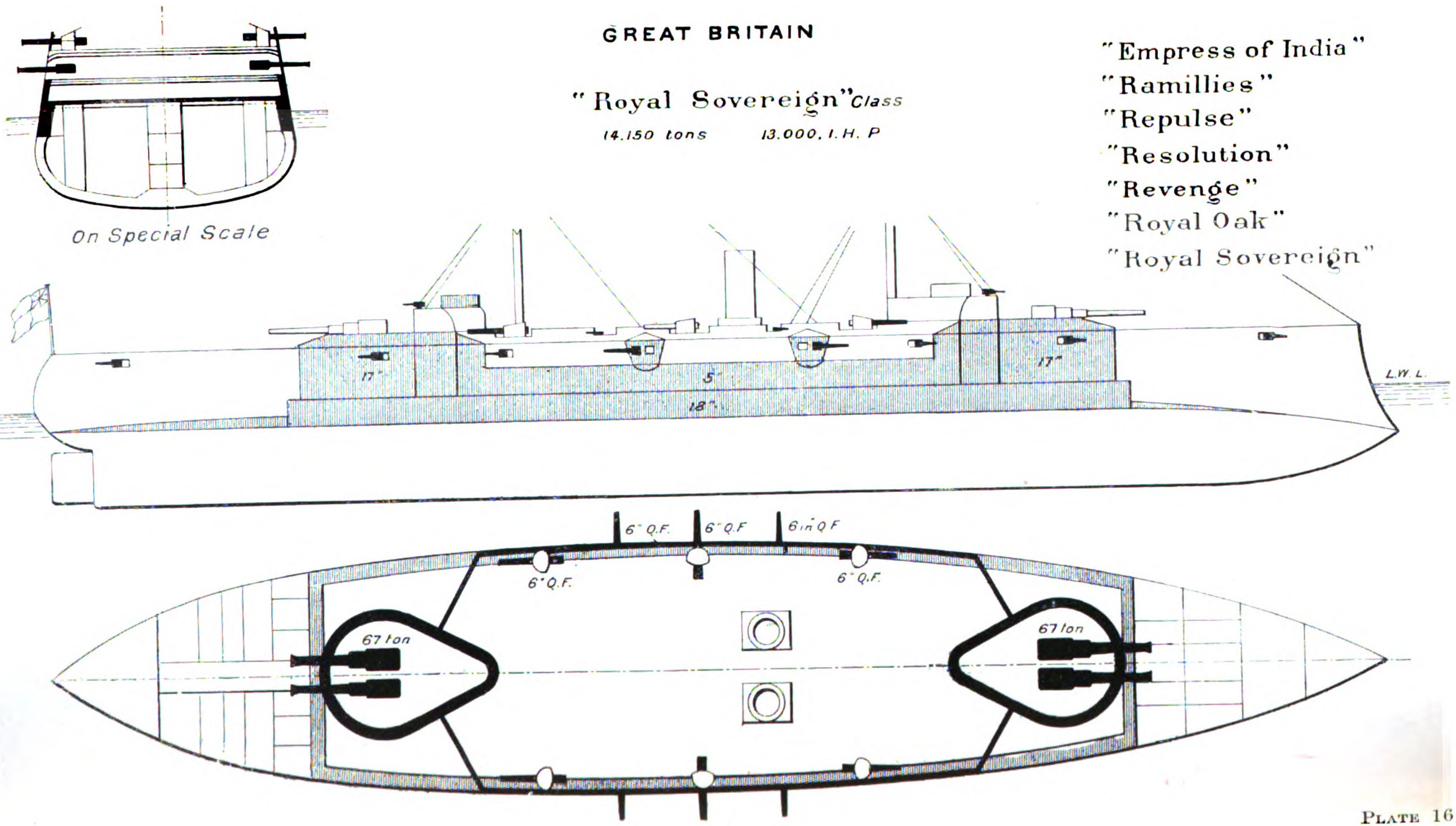
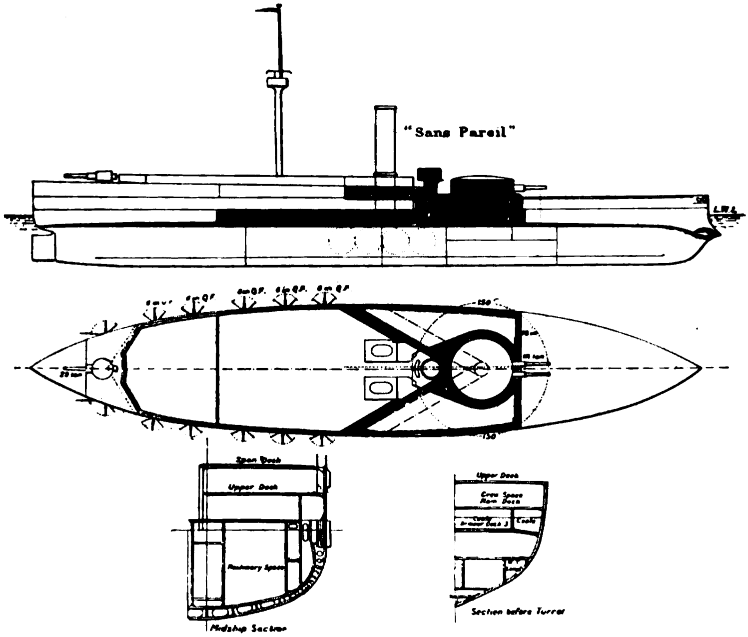
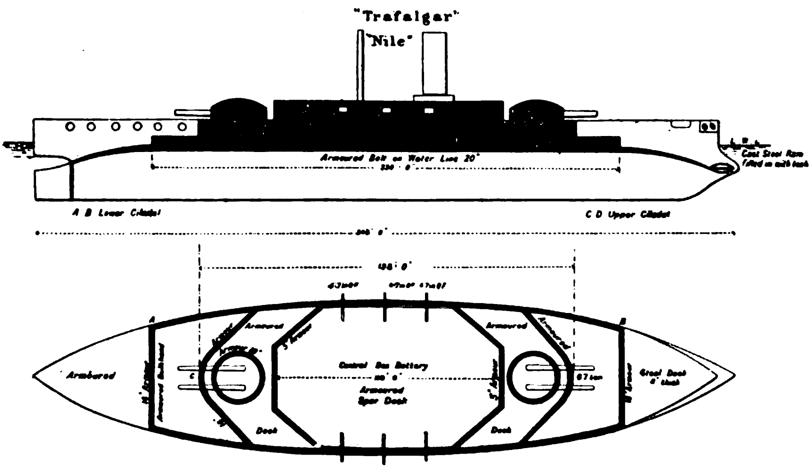


PLATE 16.

GREAT BRITAIN.





ARGENTINA

PROTECTED CRUISER

"Buenos Aires."

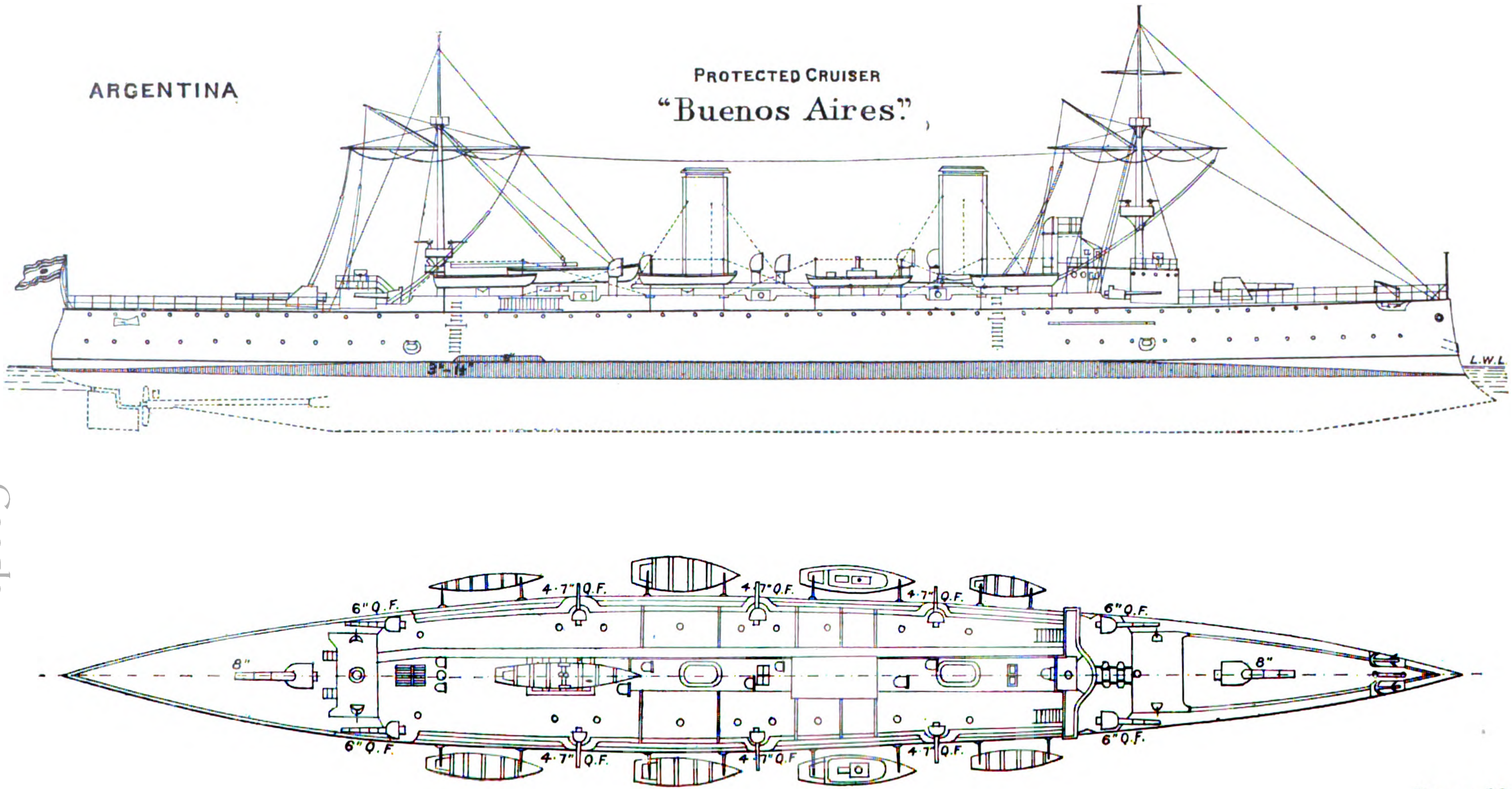


Plate 18.

ARGENTINA.

"Libertad" & "Independencia".

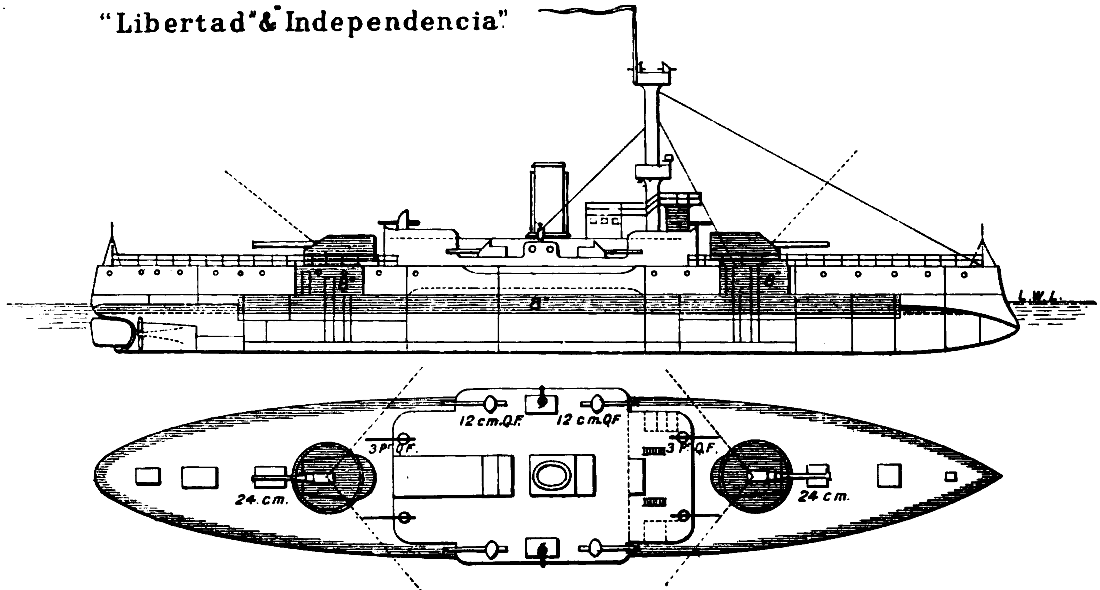
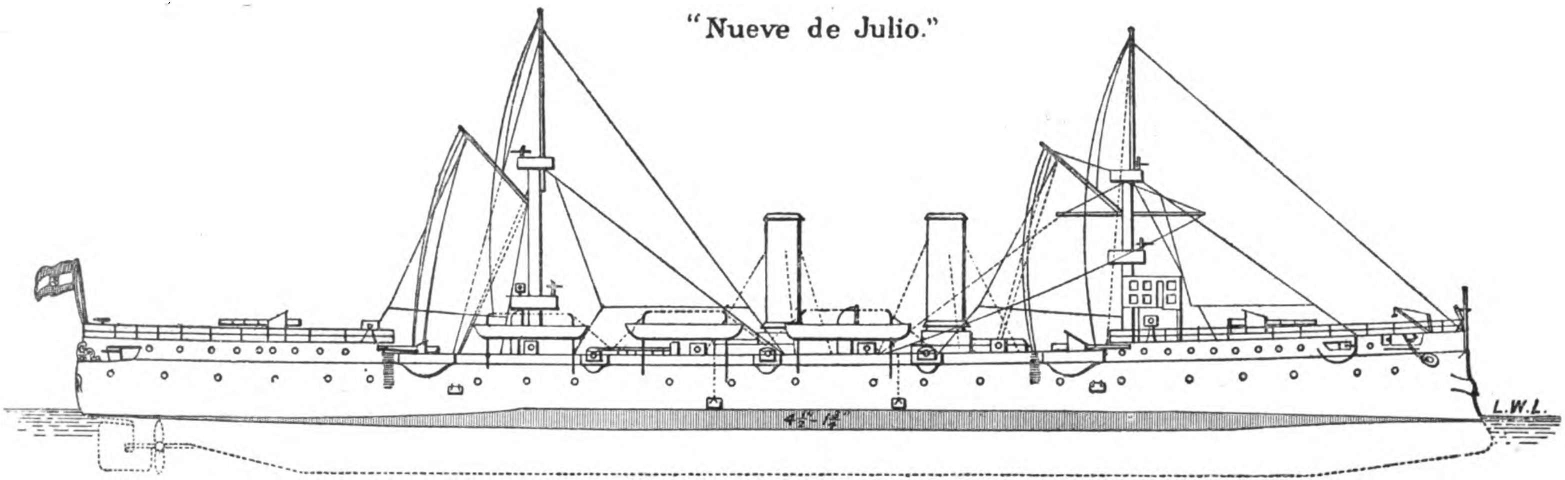


Plate 19.

ARGENTINA.

"Nueve de Julio."



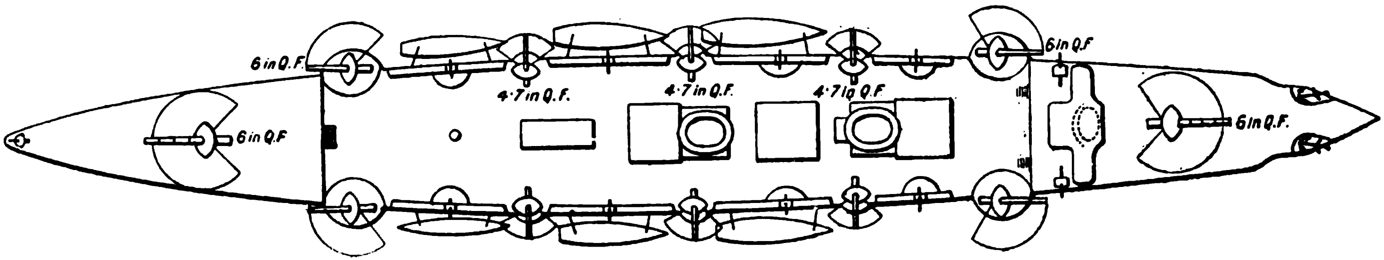
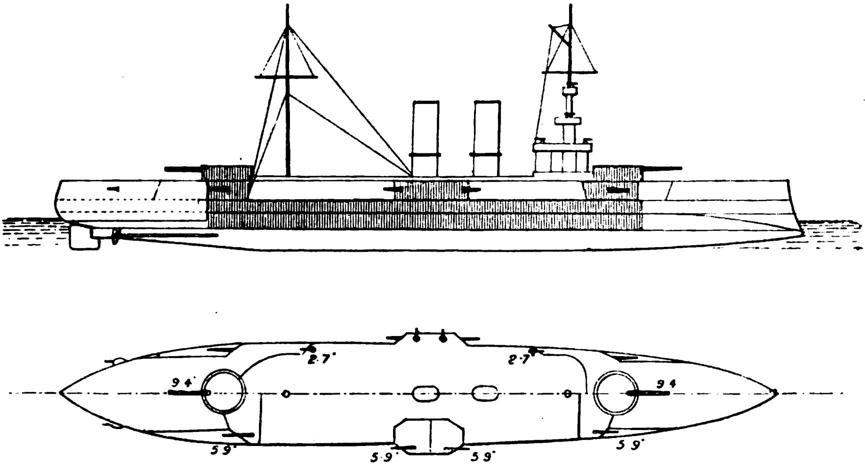


Plate 20.

AUSTRIA-HUNGARY.

Kreuzer "D"



Zenta

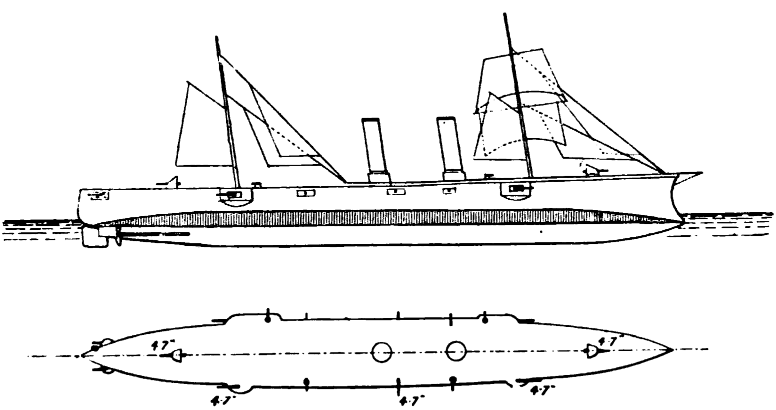


Plate 21.

AUSTRIA-HUNGARY "Kaiserin Maria Teresa"

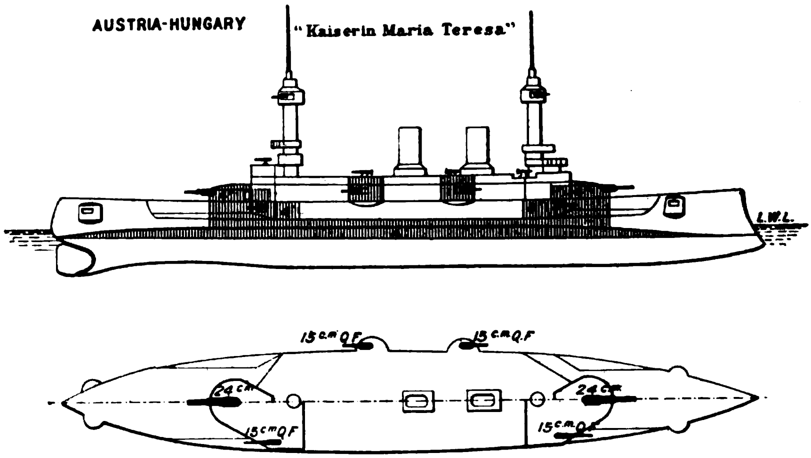
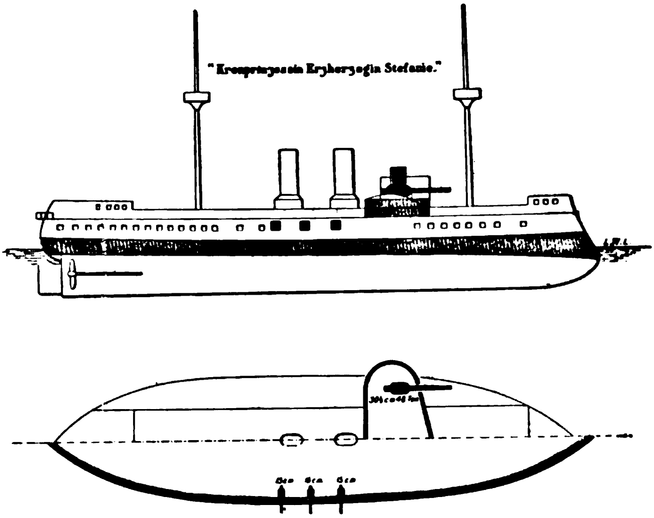


PLATE 22.

AUSTRIA-HUNGARY.



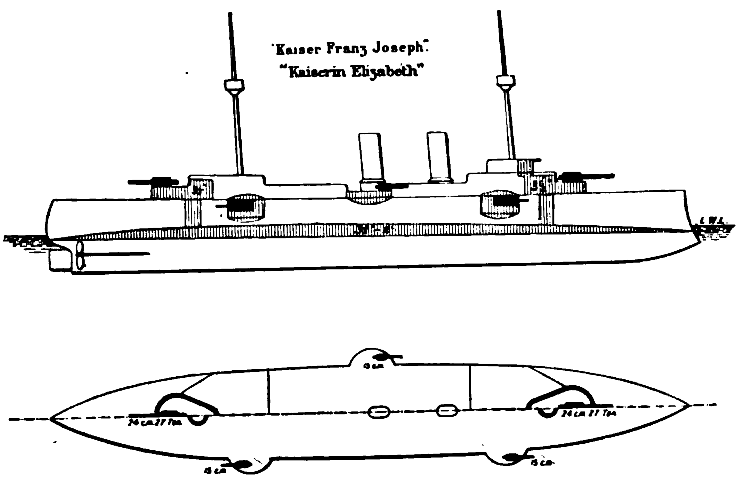
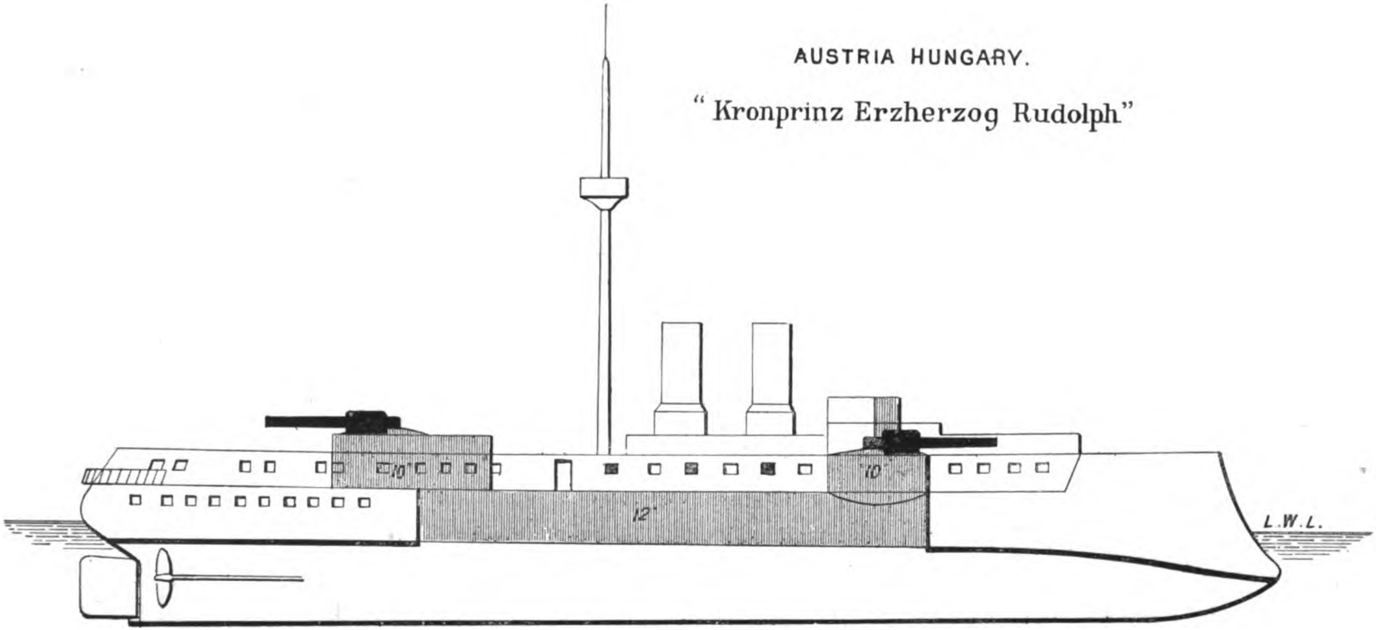
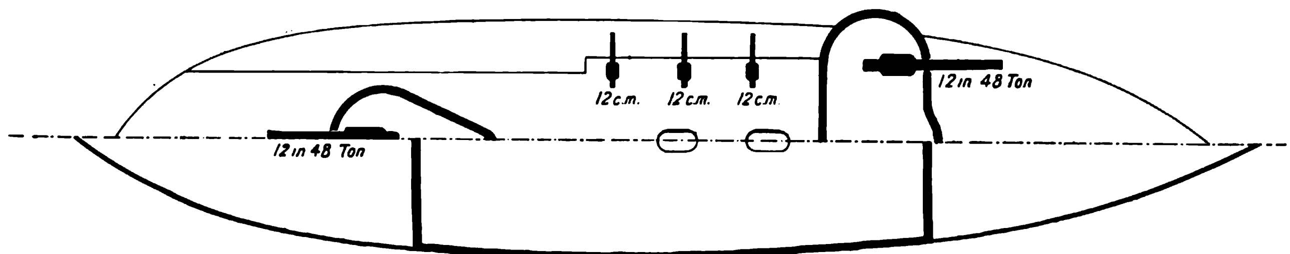


Plate 23.

AUSTRIA HUNGARY.

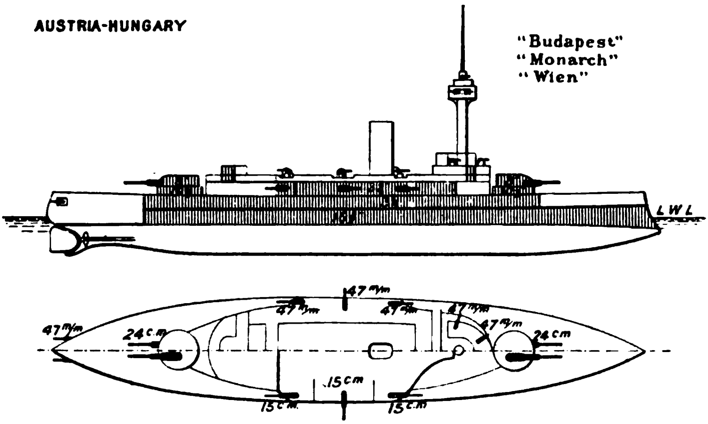
"Kronprinz Erzherzog Rudolph"





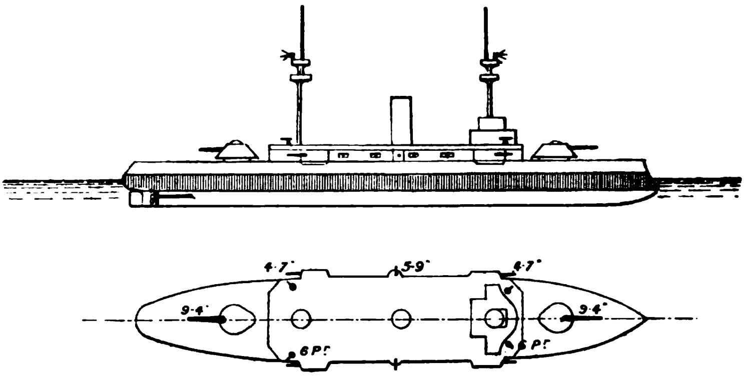
AUSTRIA-HUNGARY

"Budapest"
"Monarch"
"Wien"



BRAZIL.

Marshal Deodoro
Marshal Floriano.



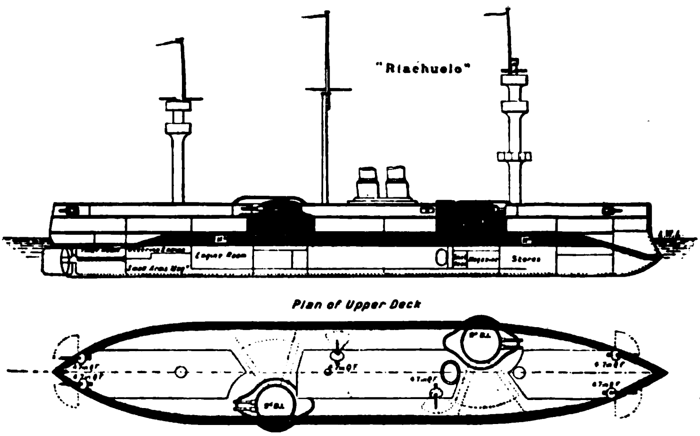
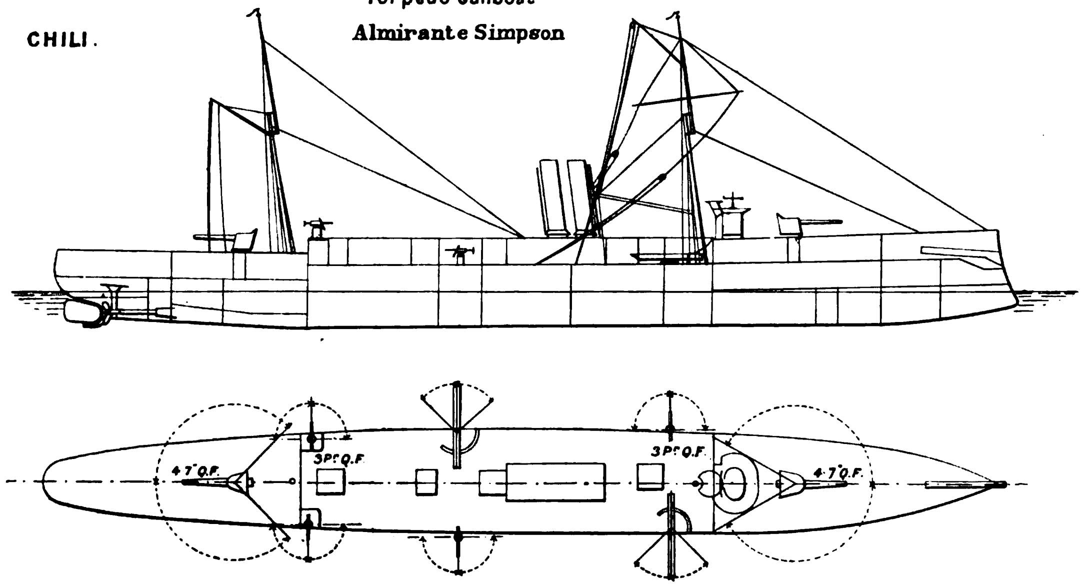


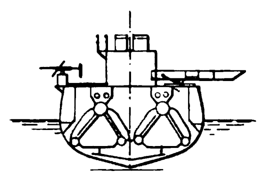
Plate 26.

CHILI.

Torpedo Gunboat

Almirante Simpson





Section at Boilers

CHILI.

"Blanco Encalada"

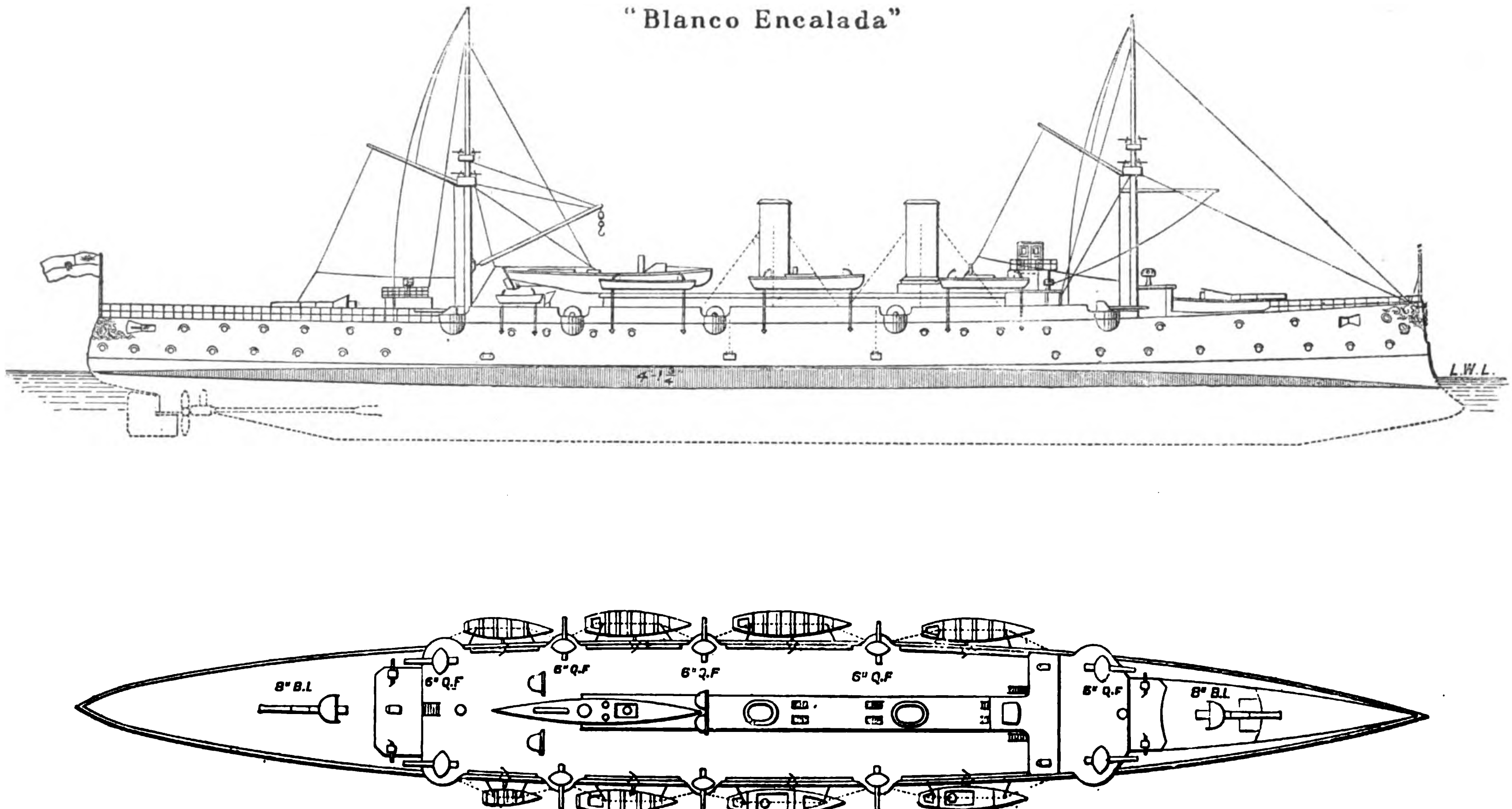
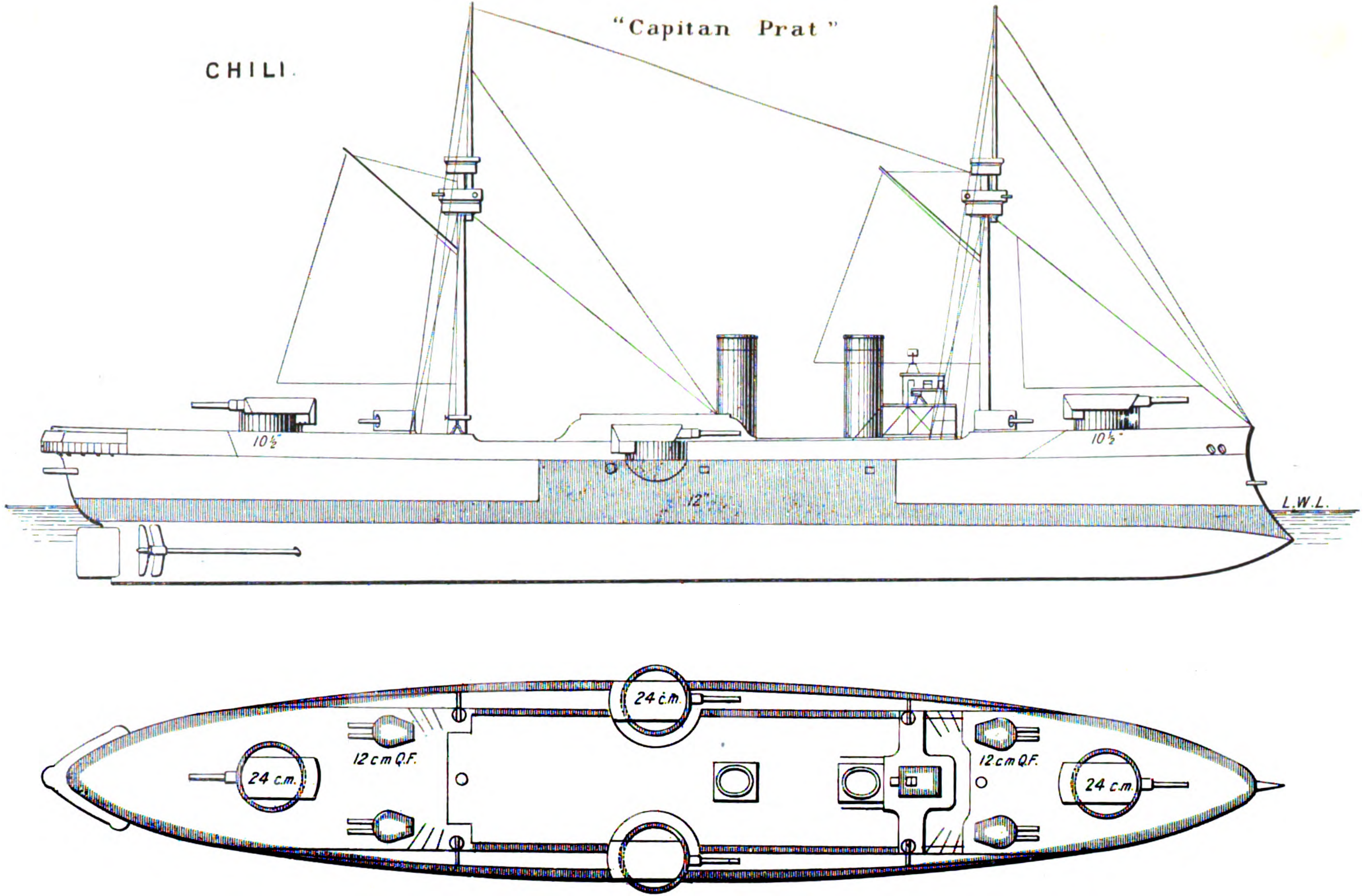


Plate 28.

CHILI.

"Capitan Prat"



CHILI

Armoured Cruiser

"Esmeralda"

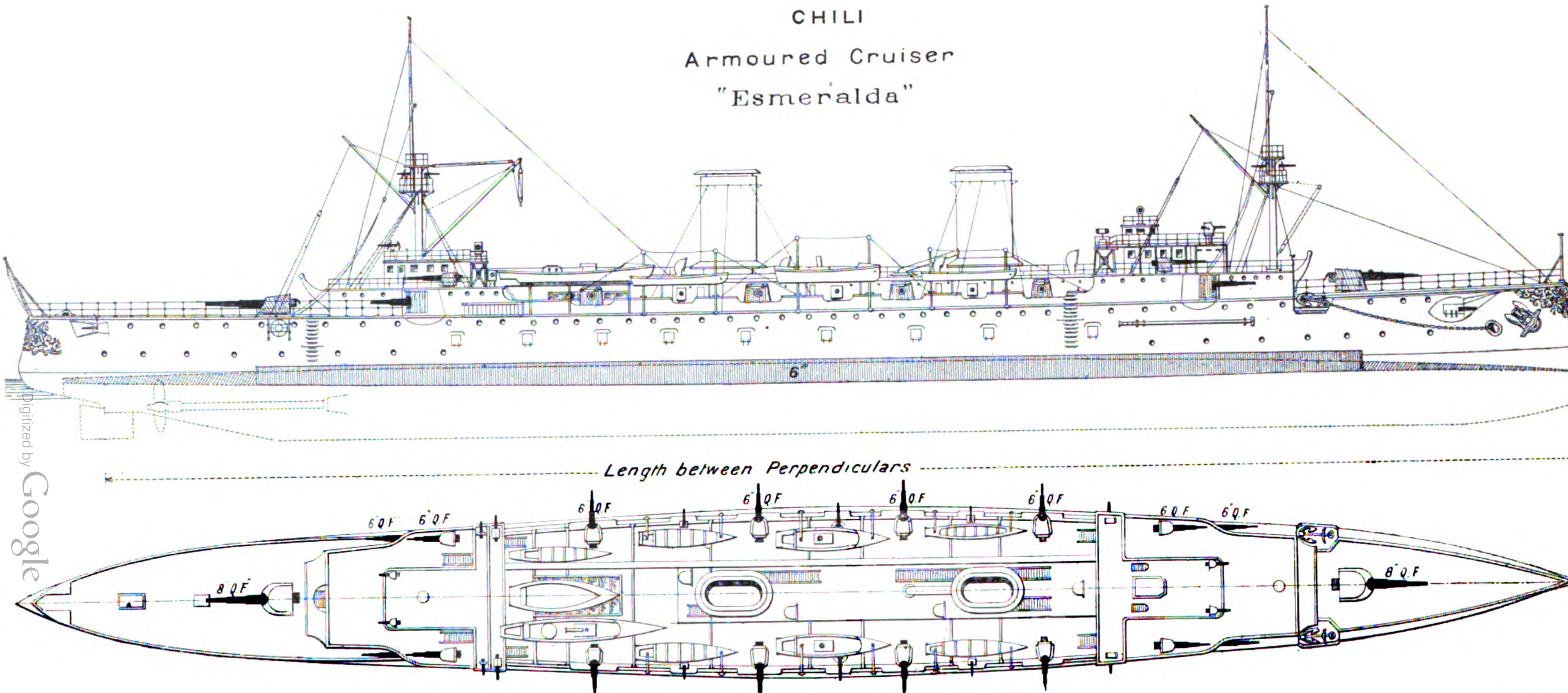
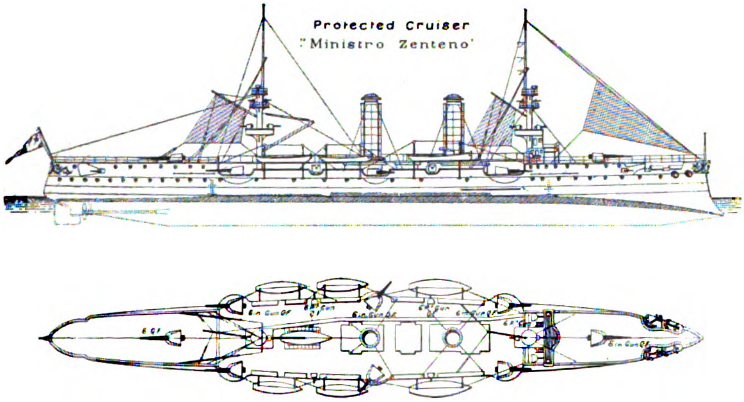


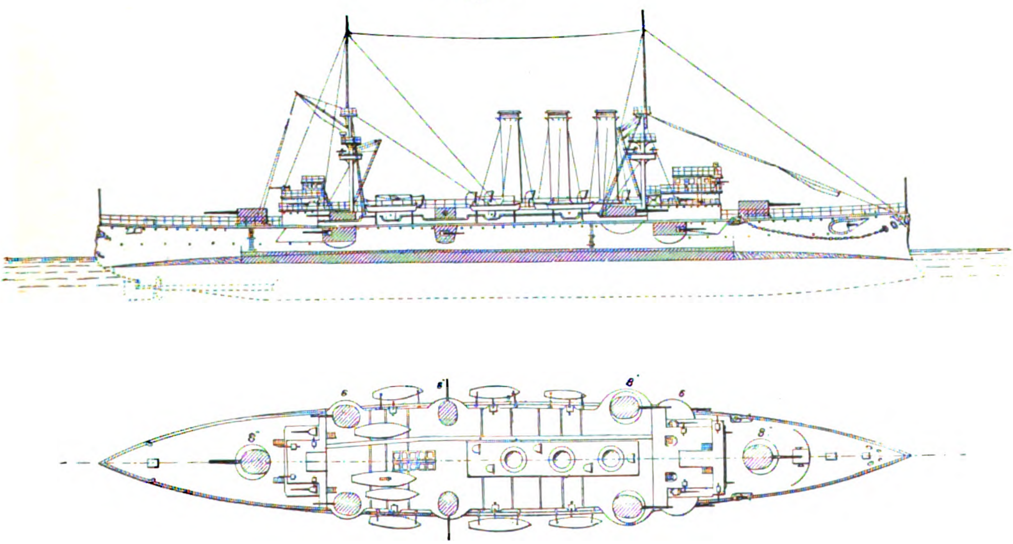
Plate 3

CHILI.

Protected Cruiser
"Ministro Zenteno"

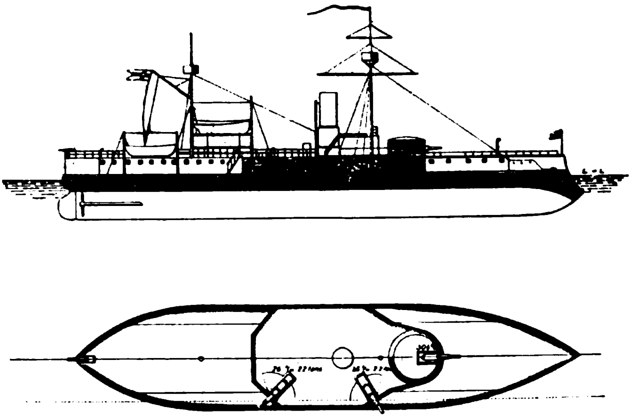


O' Higgins



DENMARK.

"Helgoland"



"Iver Hvitfeld"

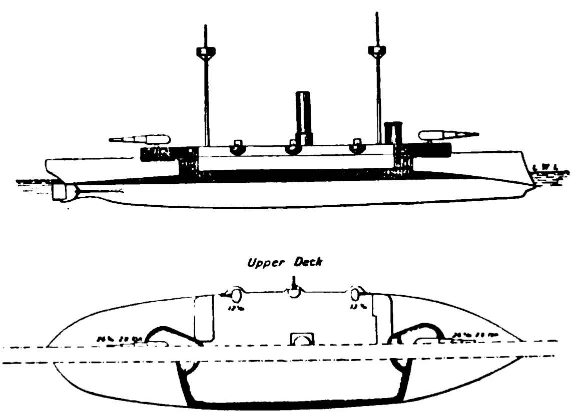
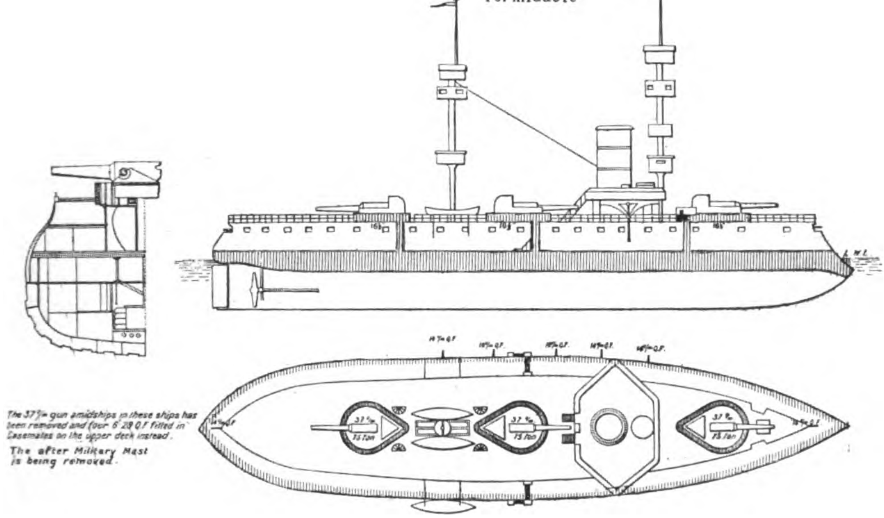


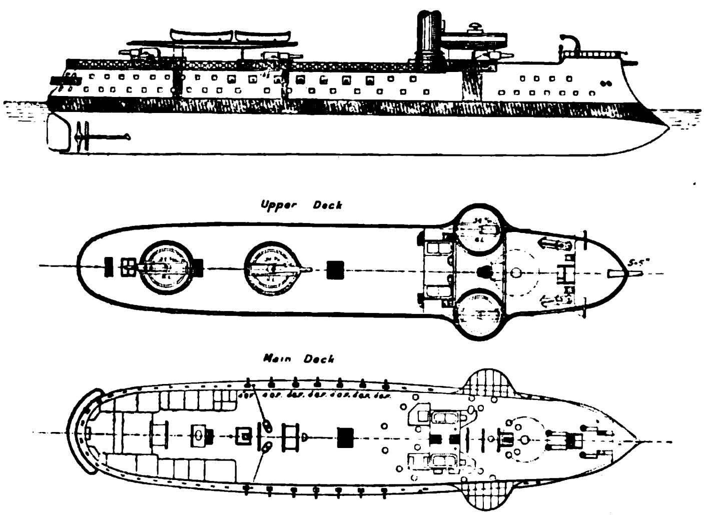
PLATE 32.

FRANCE.

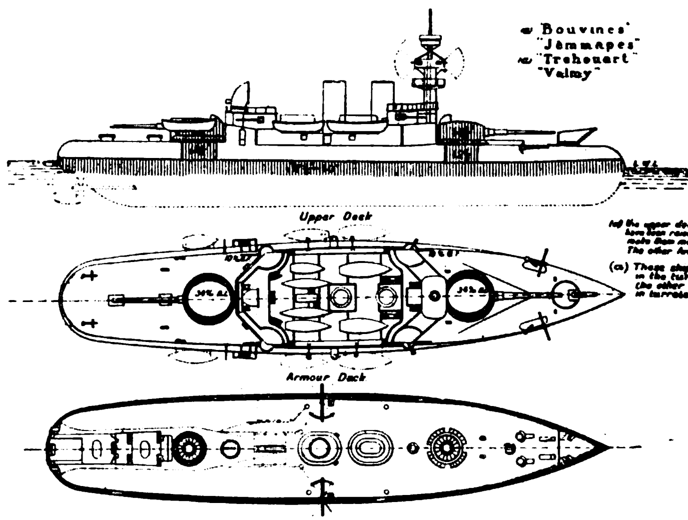
"Amiral Baudin"
"Formidable"



"Amiral Duperré"

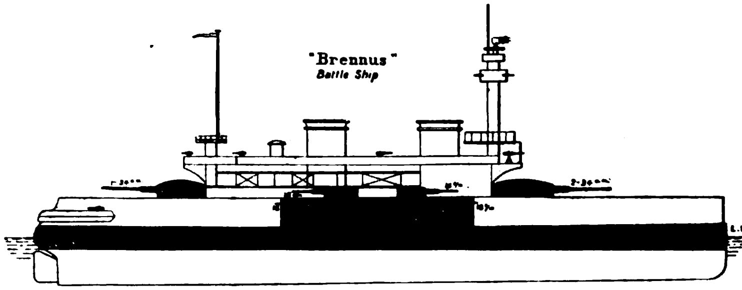


FRANCE.



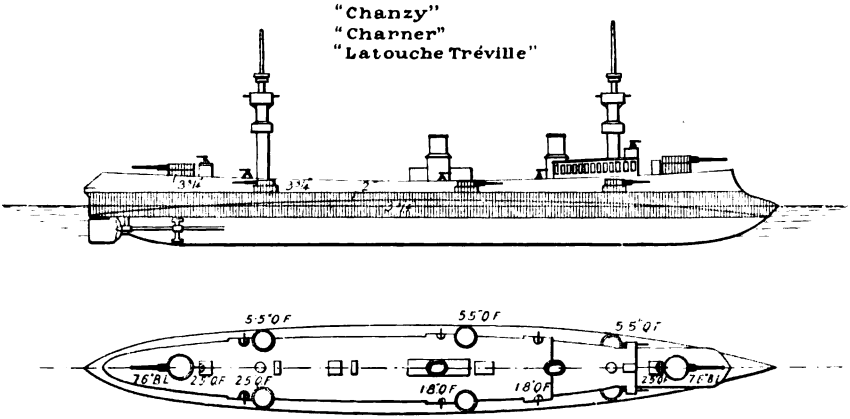
(b) The upper decks of these ships have been raised forward to make them more seaworthy. The other two are as sketch.

(a) These ships have 12 inch guns in the turrets and 8·4 in guns the other two have 13·4 in guns in turrets and 4·4 in guns

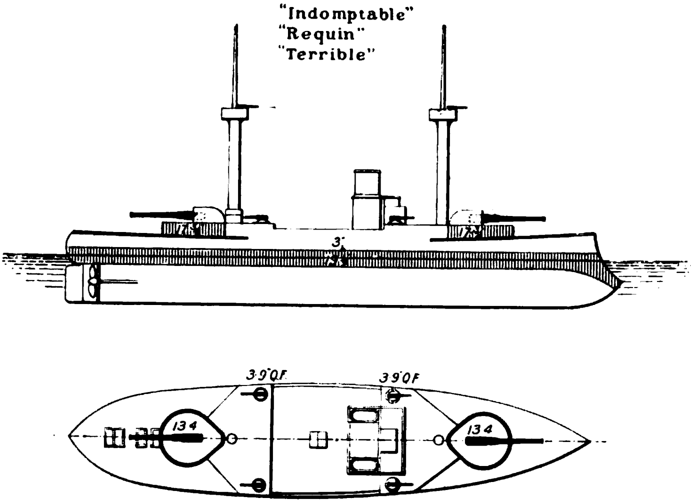


FRANCE.

"Bruix"
"Chanzy"
"Charner"
"Latouche Tréville"

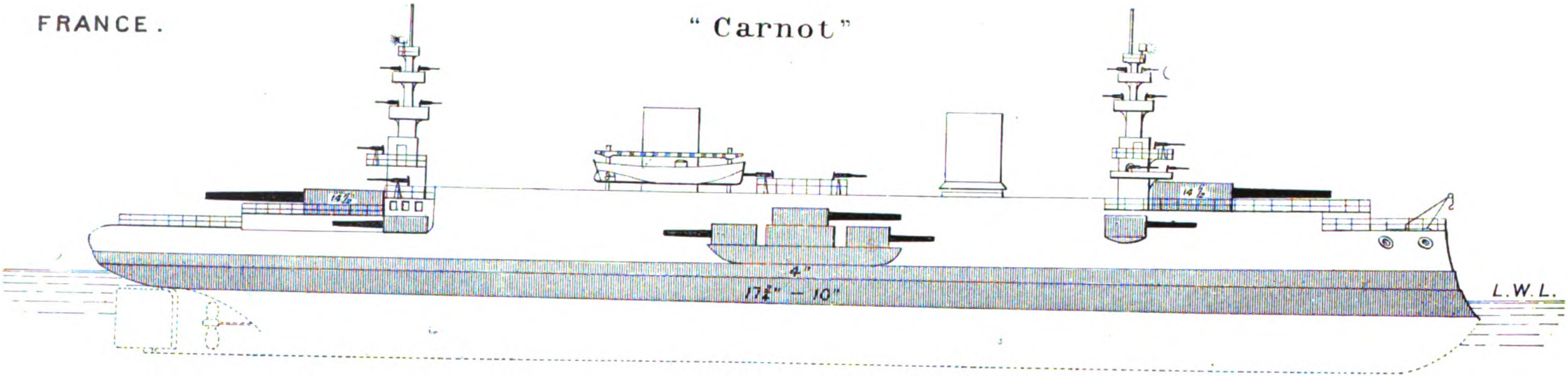


"Caiman"
"Indomptable"
"Requin"
"Terrible"



FRANCE.

"Carnot"



Note To reduce weight the after Military Mast has been taken out and the bridges cut down

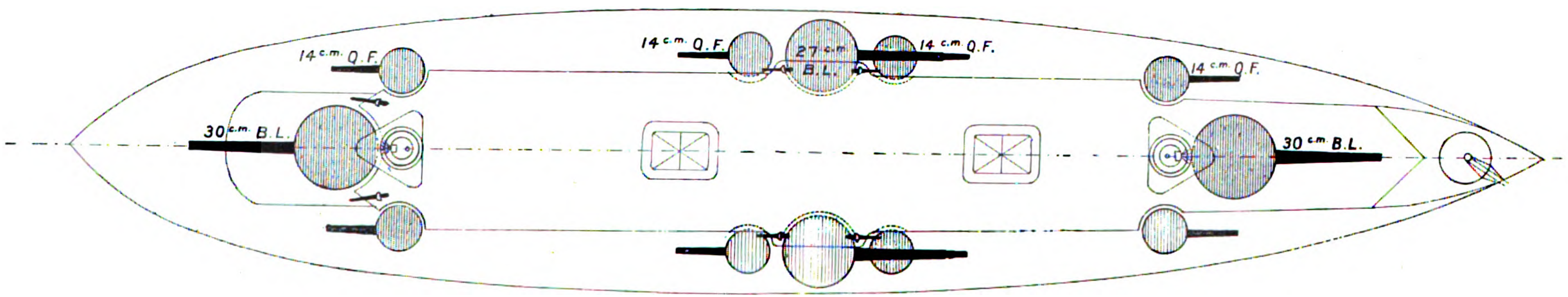
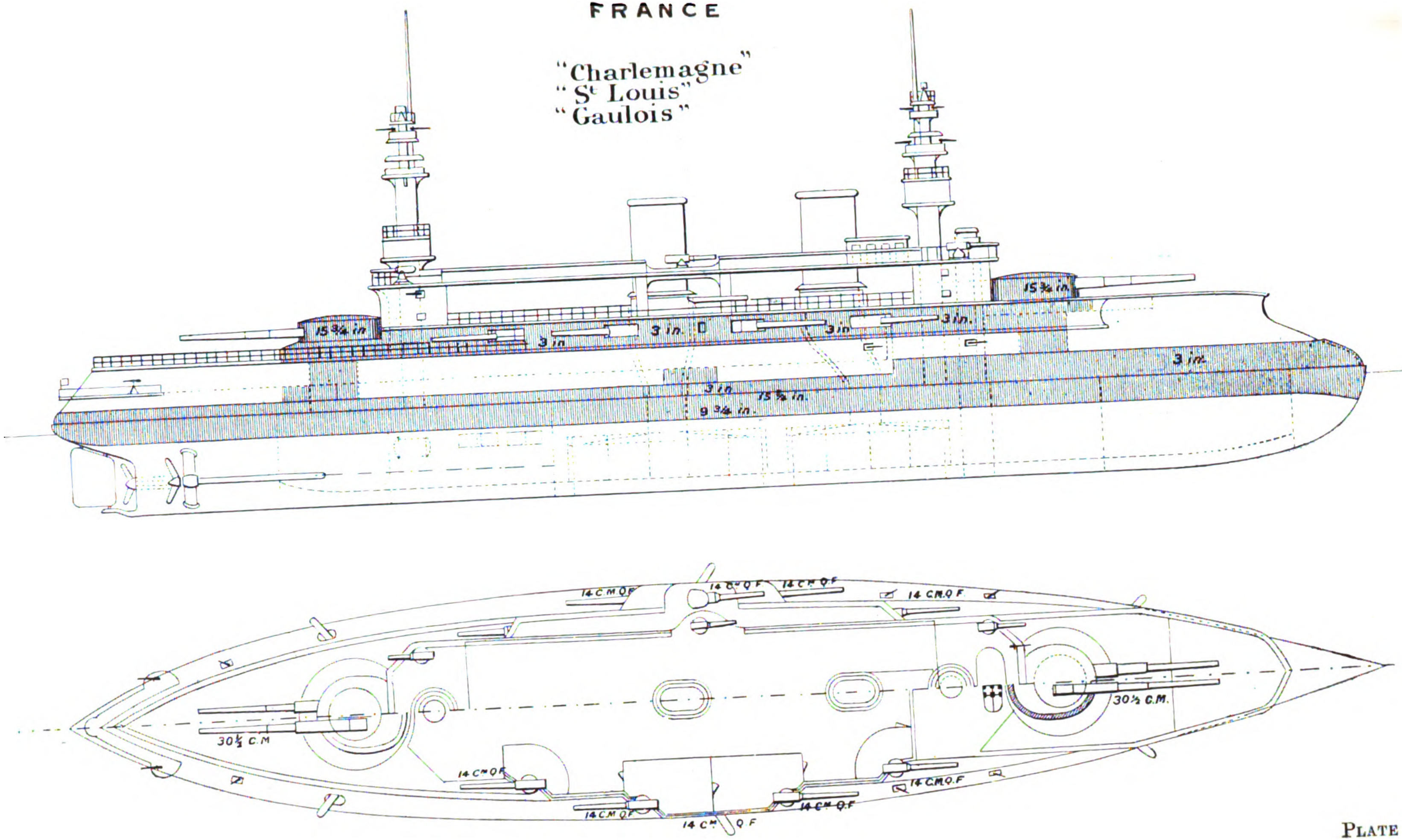


PLATE 36.

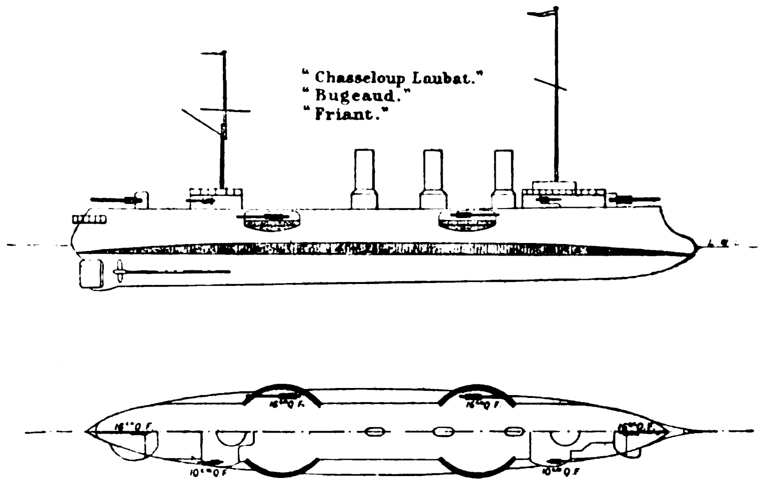
FRANCE

"Charlemagne"
"St Louis"
"Gaulois"

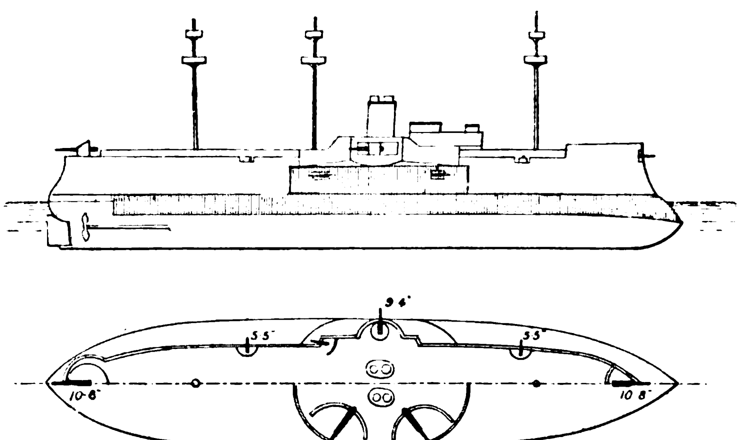


FRANCE.

"Chasseloup Laubat."
"Bugeaud."
"Friant."



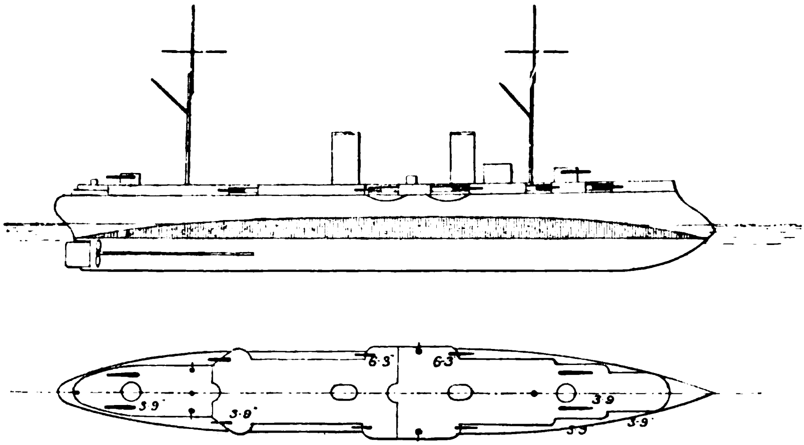
Devastation Courbet Redoutable



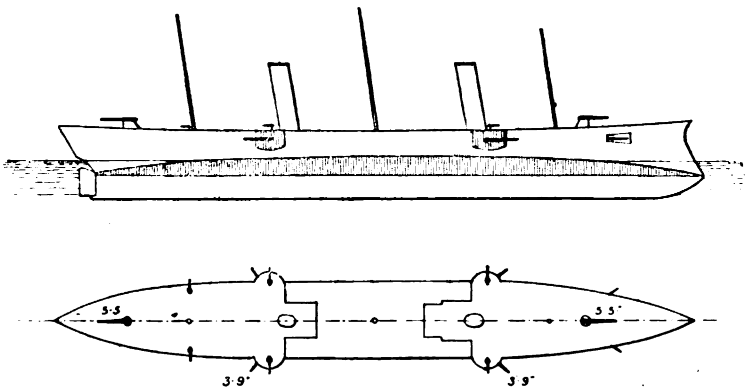
Note In the Redoutable the 4 10·6 guns in the central redoubt are replaced by 9·4 guns and the 6 5·5 guns by an equal number of 3·9" guns

FRANCE.

Descartes

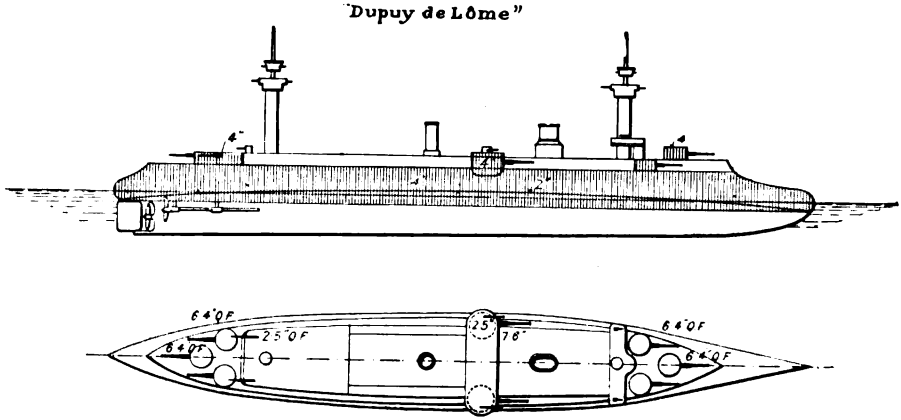


D'Estrées

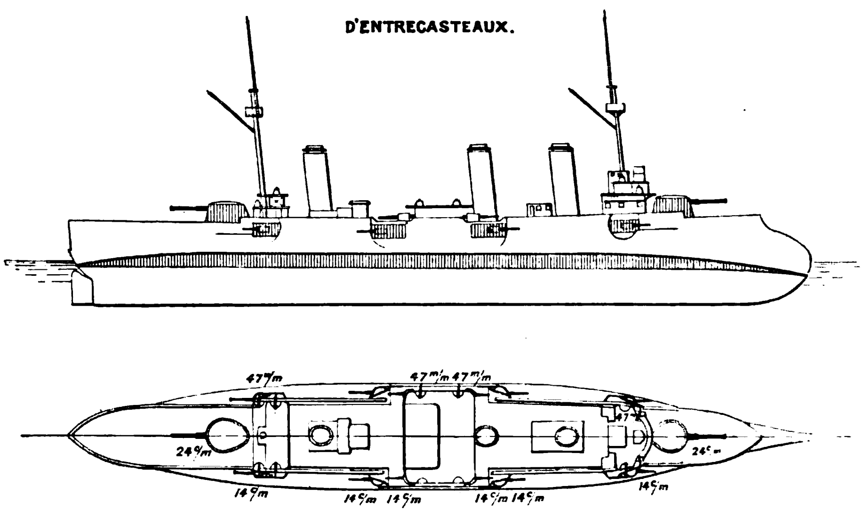


FRANCE.

"Dupuy de Lôme"

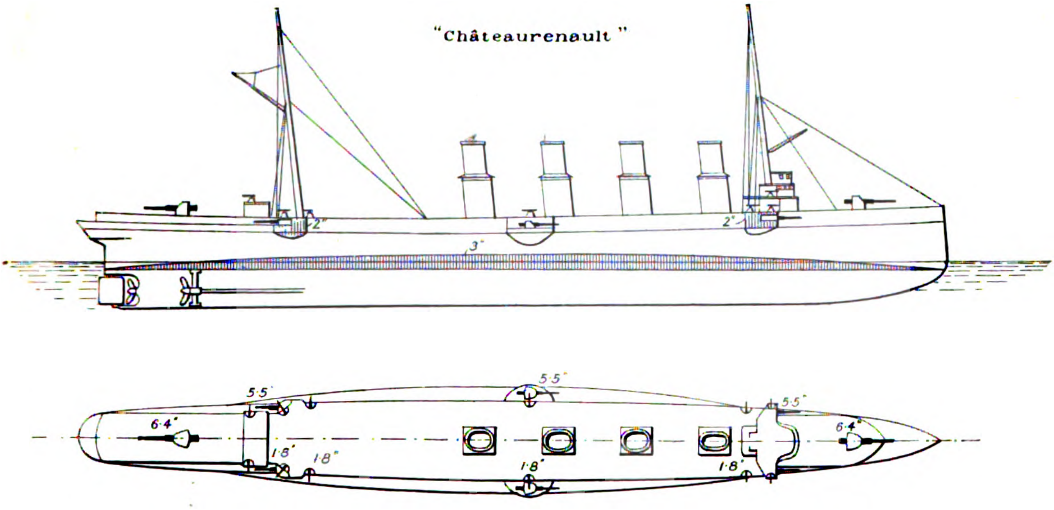


D'ENTRECASTEAUX.



FRANCE.

"Châteaurenault"



"Desaix"
"Kléber"
"Dupleix"

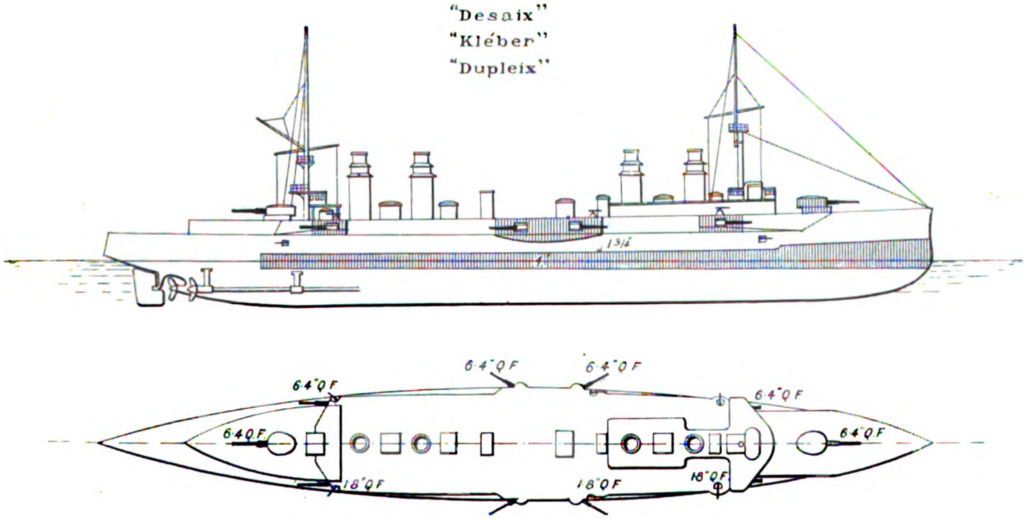
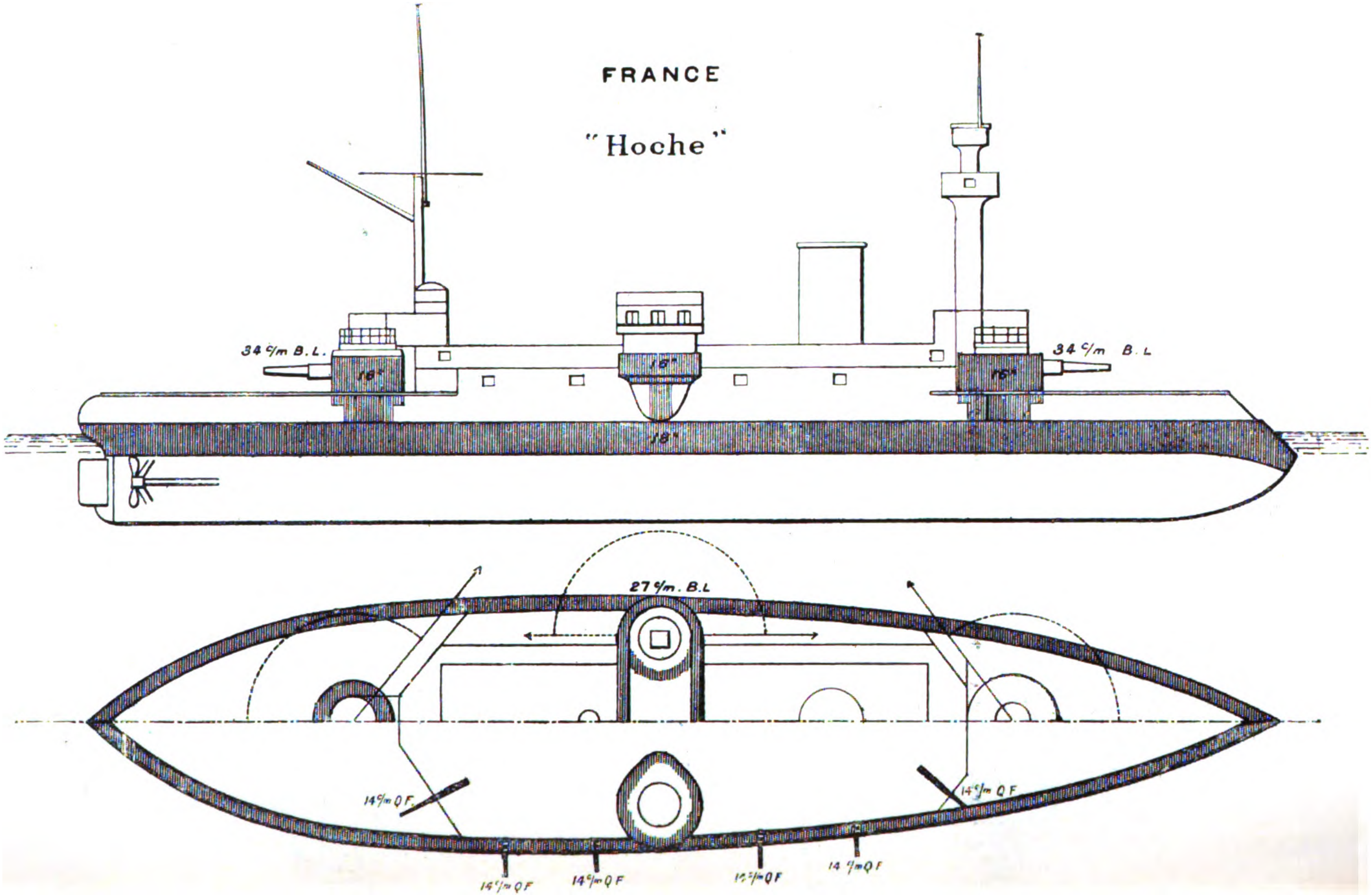


Plate 41.

FRANCE

"Hoche"



PLATE

FRENCH SHIPS.

"Jauréguiberry."

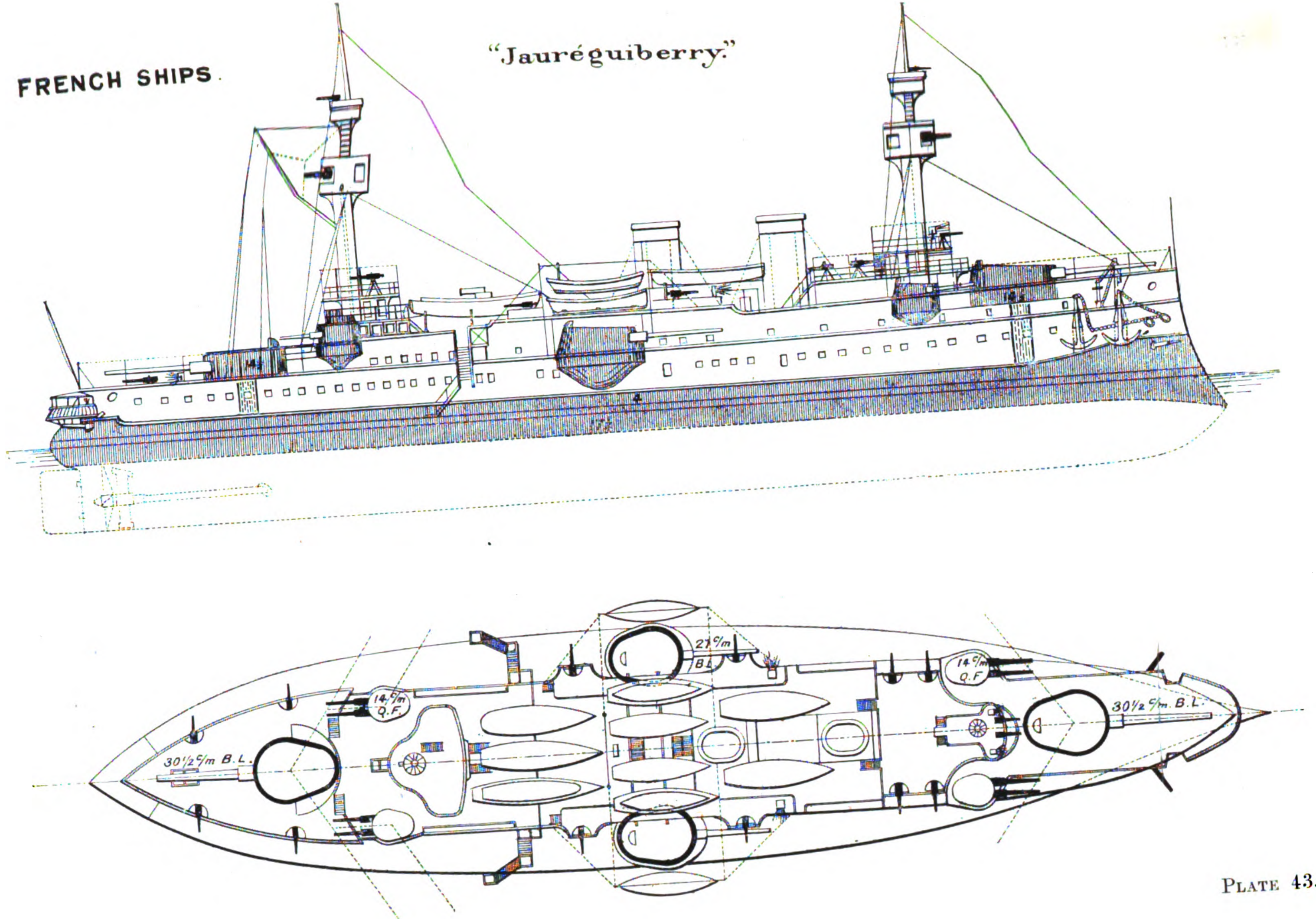


PLATE 43.

FRANCE

PROTECTED CRUISERS

"Jean-Bart"
"Alger"
"Isly"

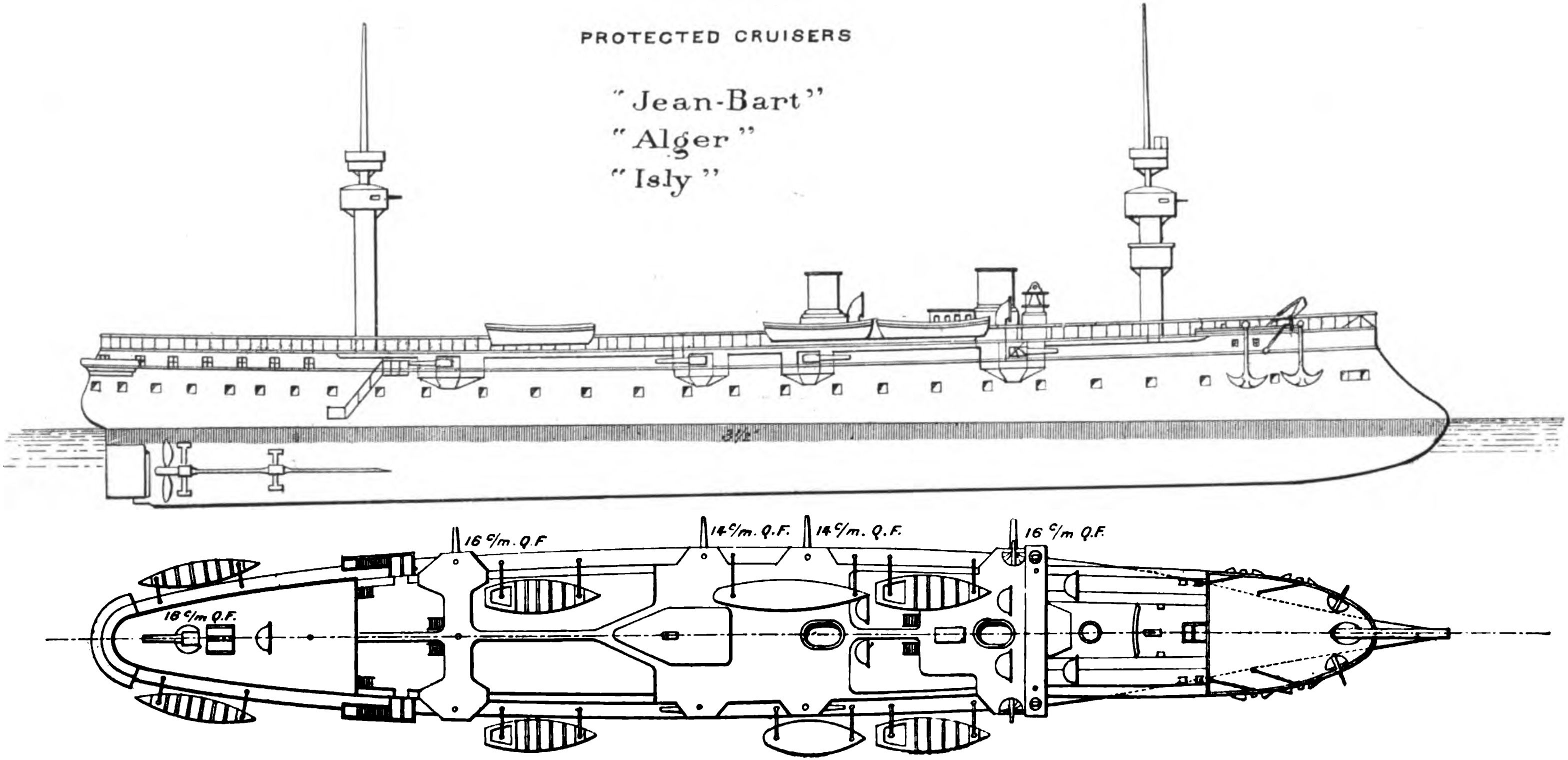
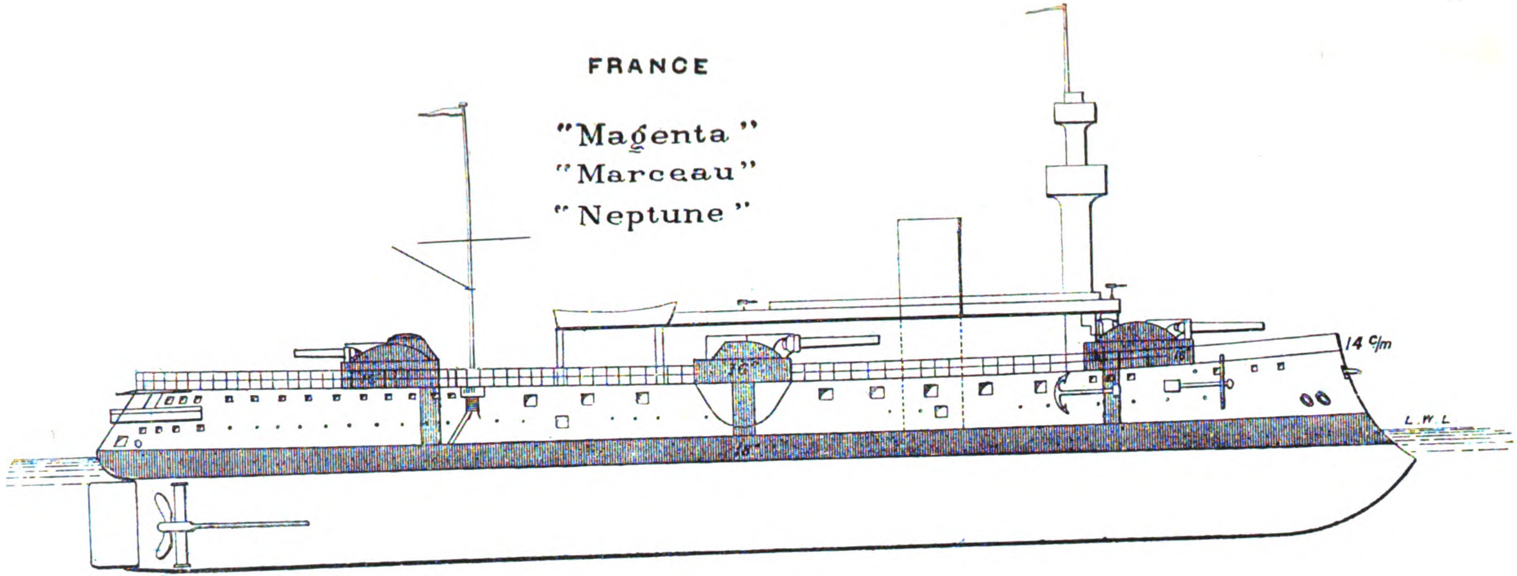
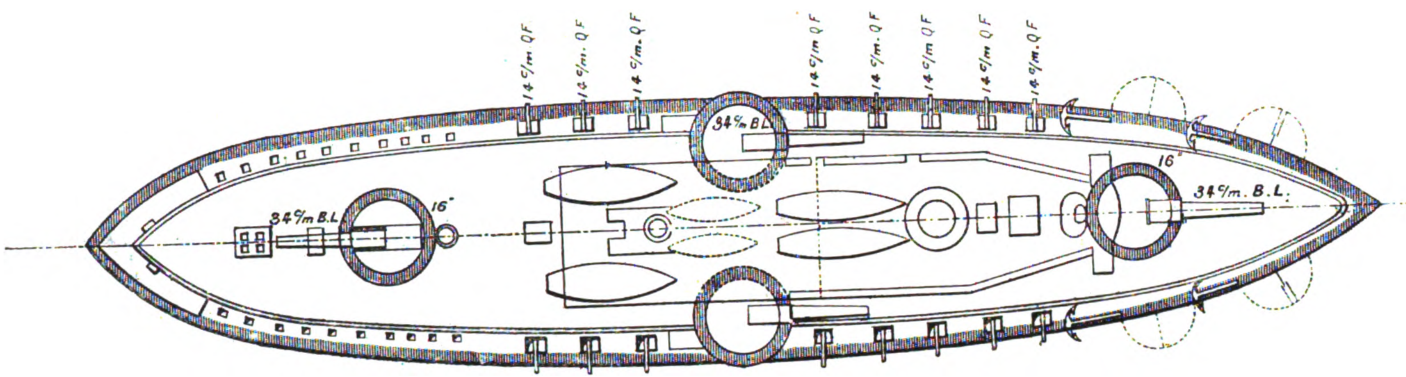


PLATE 44.

FRANCE

"Magenta"
"Marceau"
"Neptune"

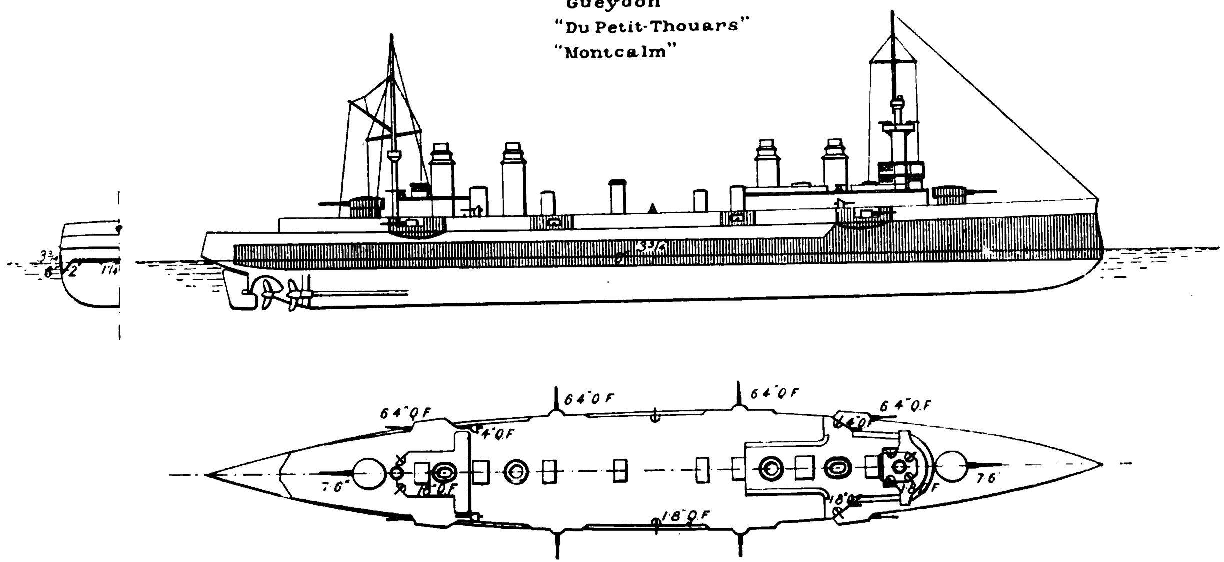




PLATE

FRANCE.

"Gueydon"
"Du Petit-Thouars"
"Montcalm"



Germany.

"Freya"
"Hansa"
"Hertha"
"Victoria Louise"
"Vineta"

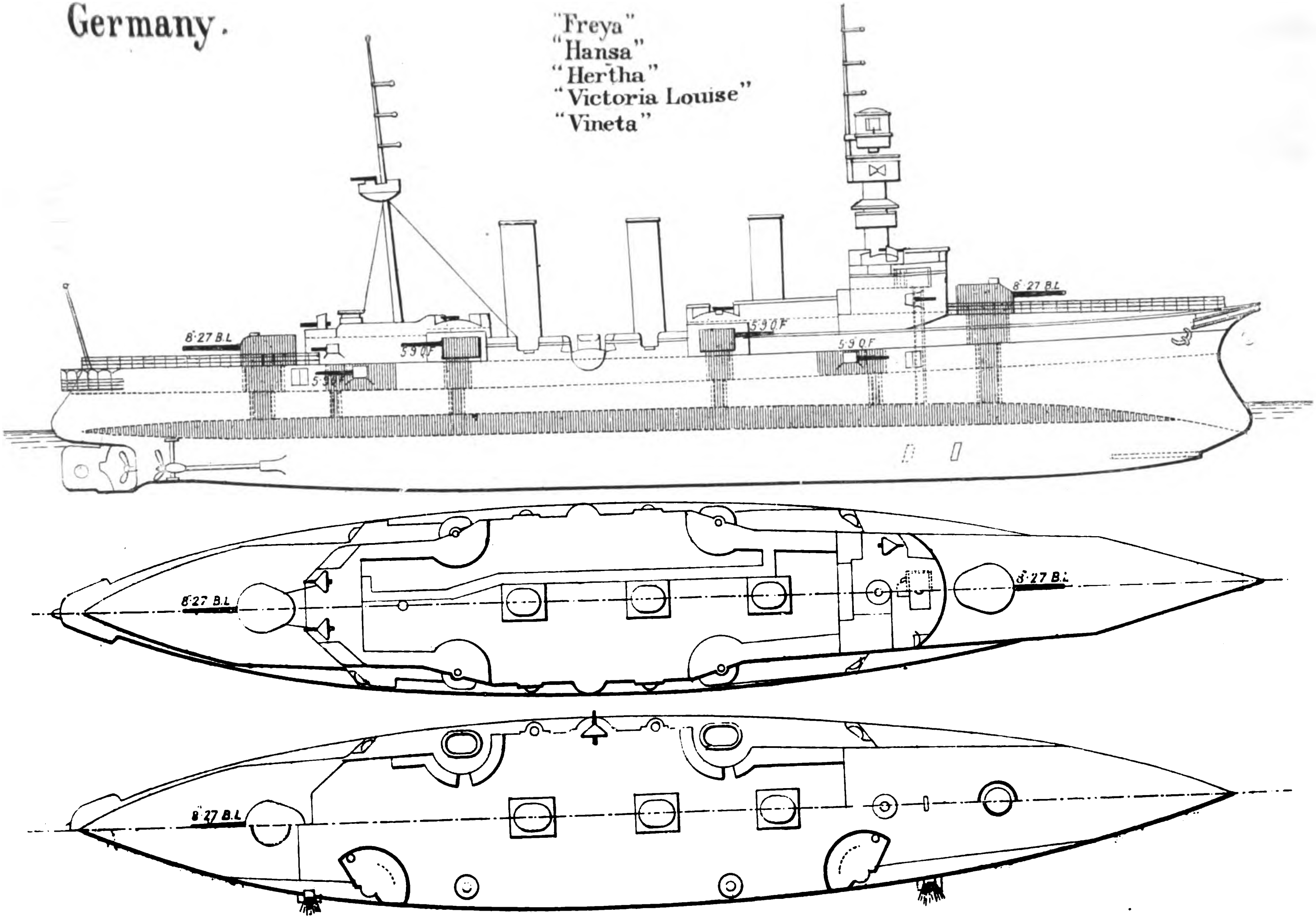


PLATE 47.

Germany

"Fürst Bismarck"

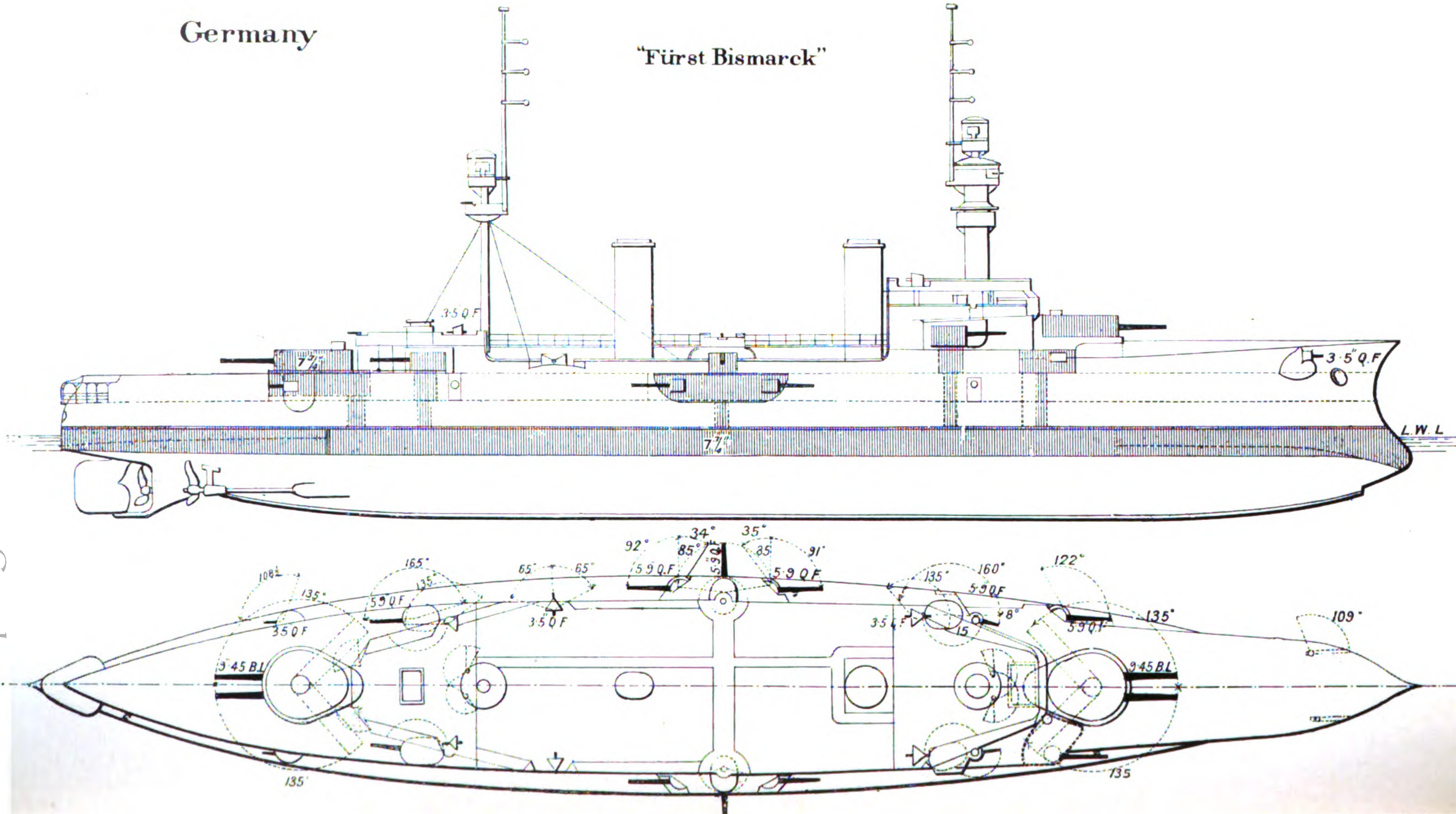
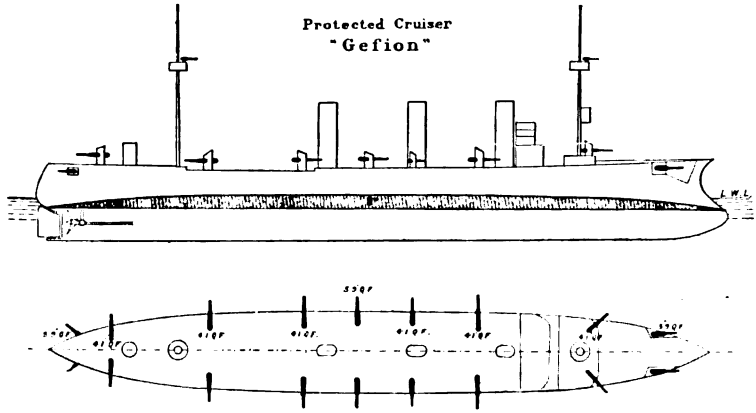


Plate 48.

GERMANY.

Protected Cruiser
"Gefion"



"Kaiserin Augusta"

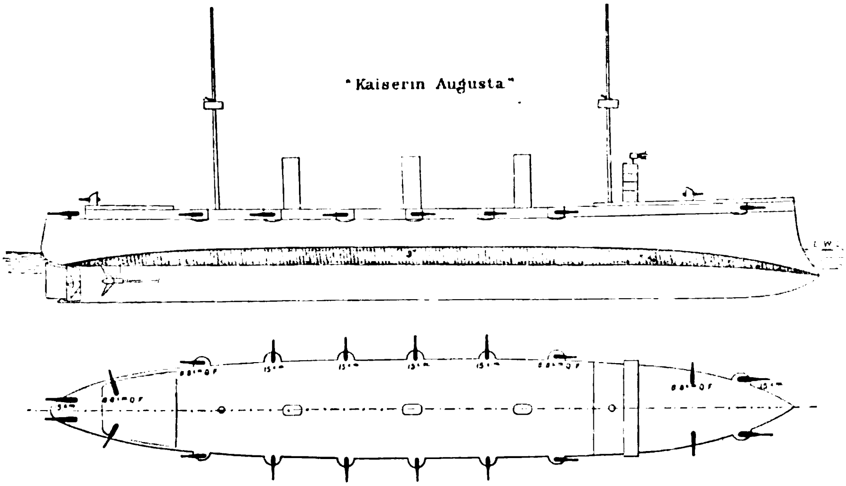
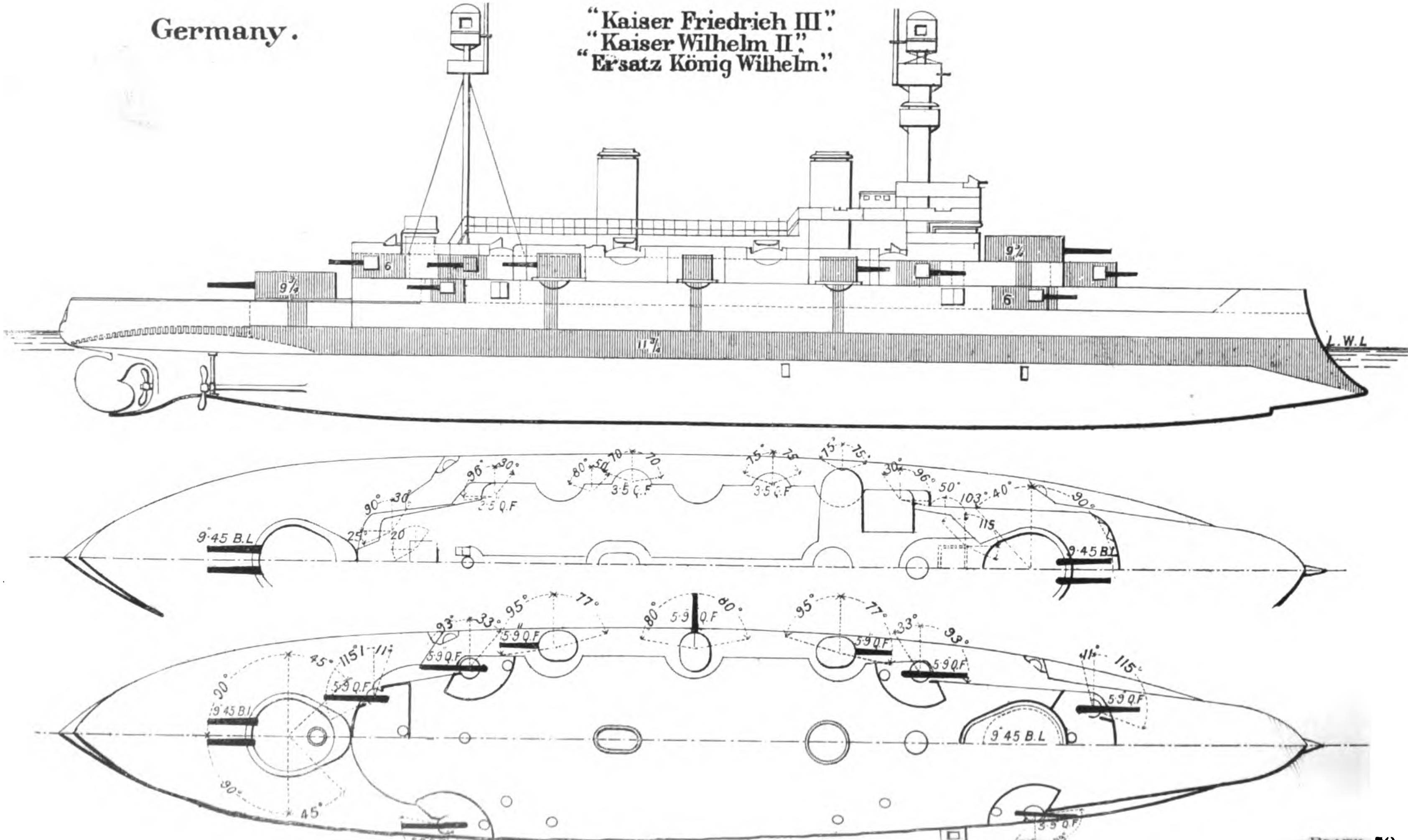


Plate 49.

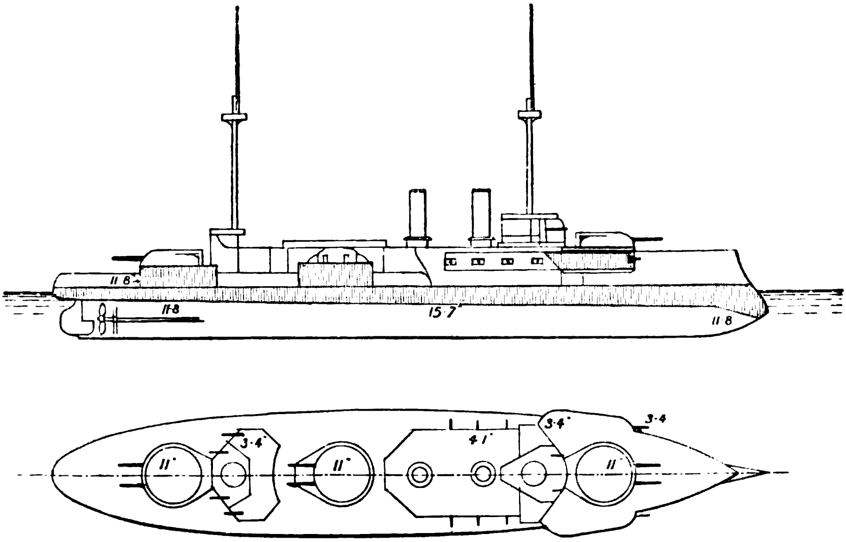
Germany.

"Kaiser Friedrich III."
"Kaiser Wilhelm II."
"Ersatz König Wilhelm."



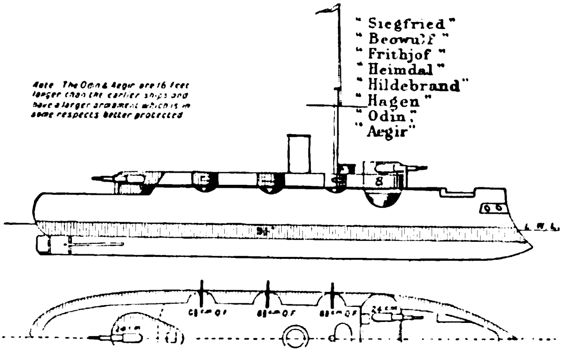
GERMANY.

Kürfurst Friedrich Wilhelm.
Brandenburg.
Weissenburg.
Wörth



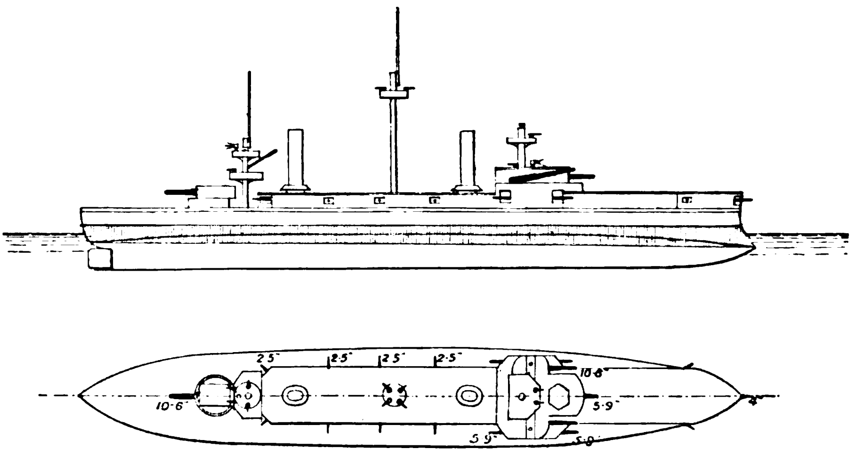
"Siegfried"
"Beowulf"
"Frithjof"
"Heimdal"
"Hildebrand"
"Hagen"
"Odin"
"Aegir"

Note The Odin & Aegir are 16 feet longer than the earlier ships and have a larger armament which is in some respects better protected



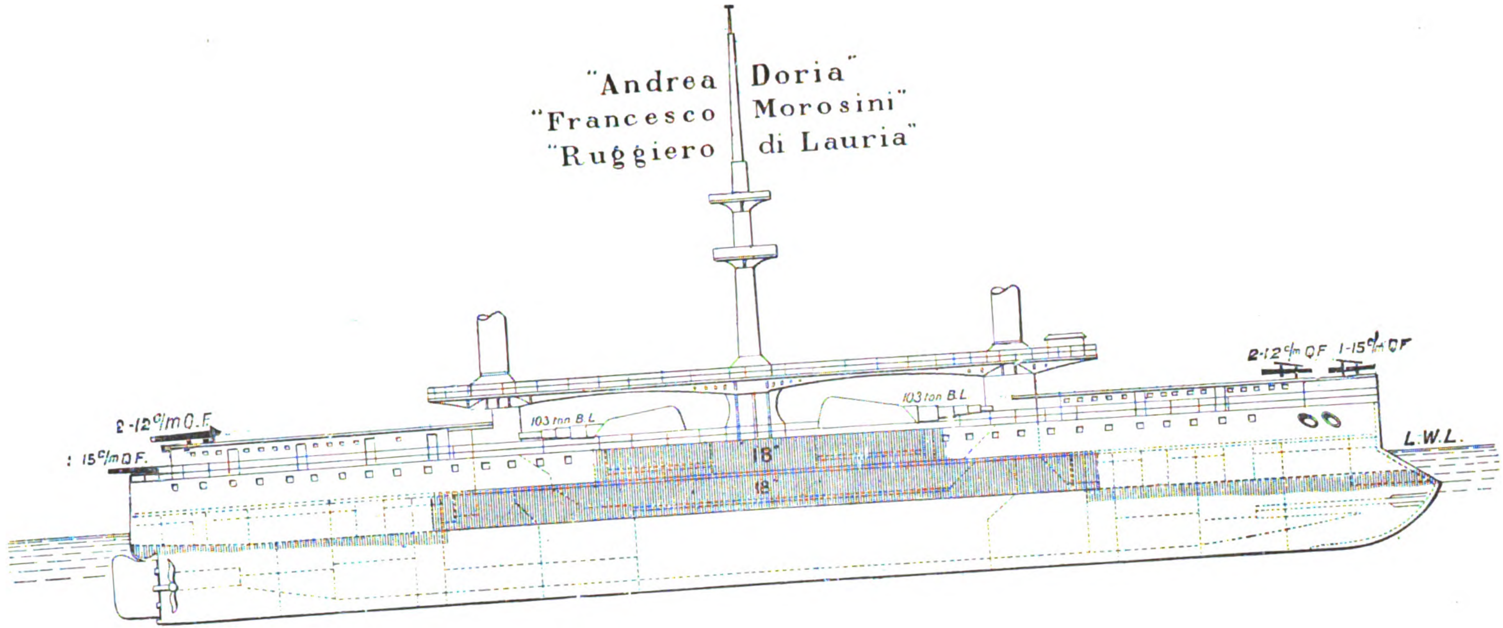
GREECE.

Hydra. Psara. Spetsai.



ITALY.

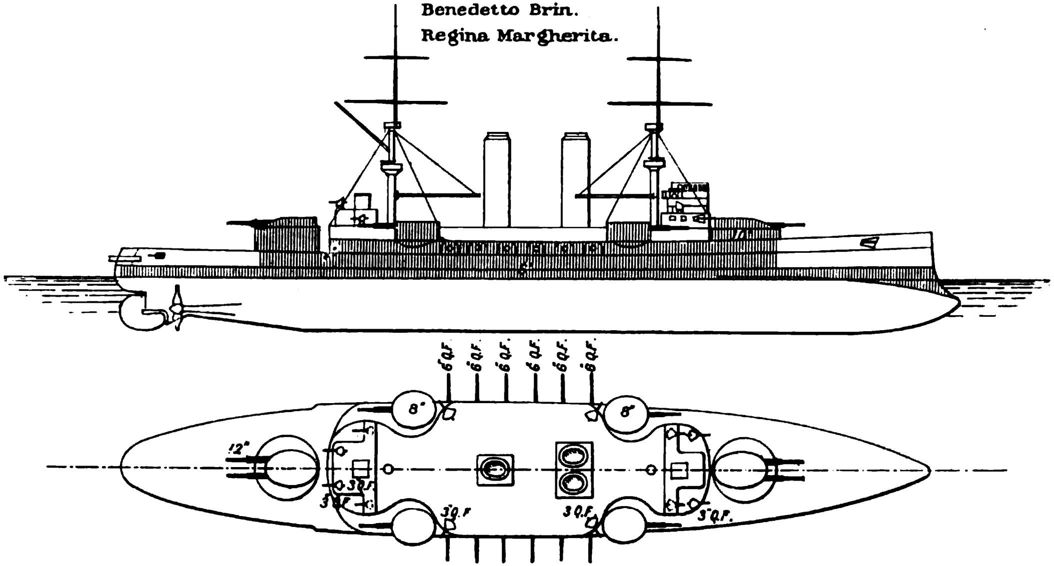
"Andrea Doria"
"Francesco Morosini"
"Ruggiero di Lauria"



PLATE

ITALY.

Benedetto Brin.
Regina Margherita.



ITALY.

"Duilio"
"Dandolo"
(As refitted and rearmed)

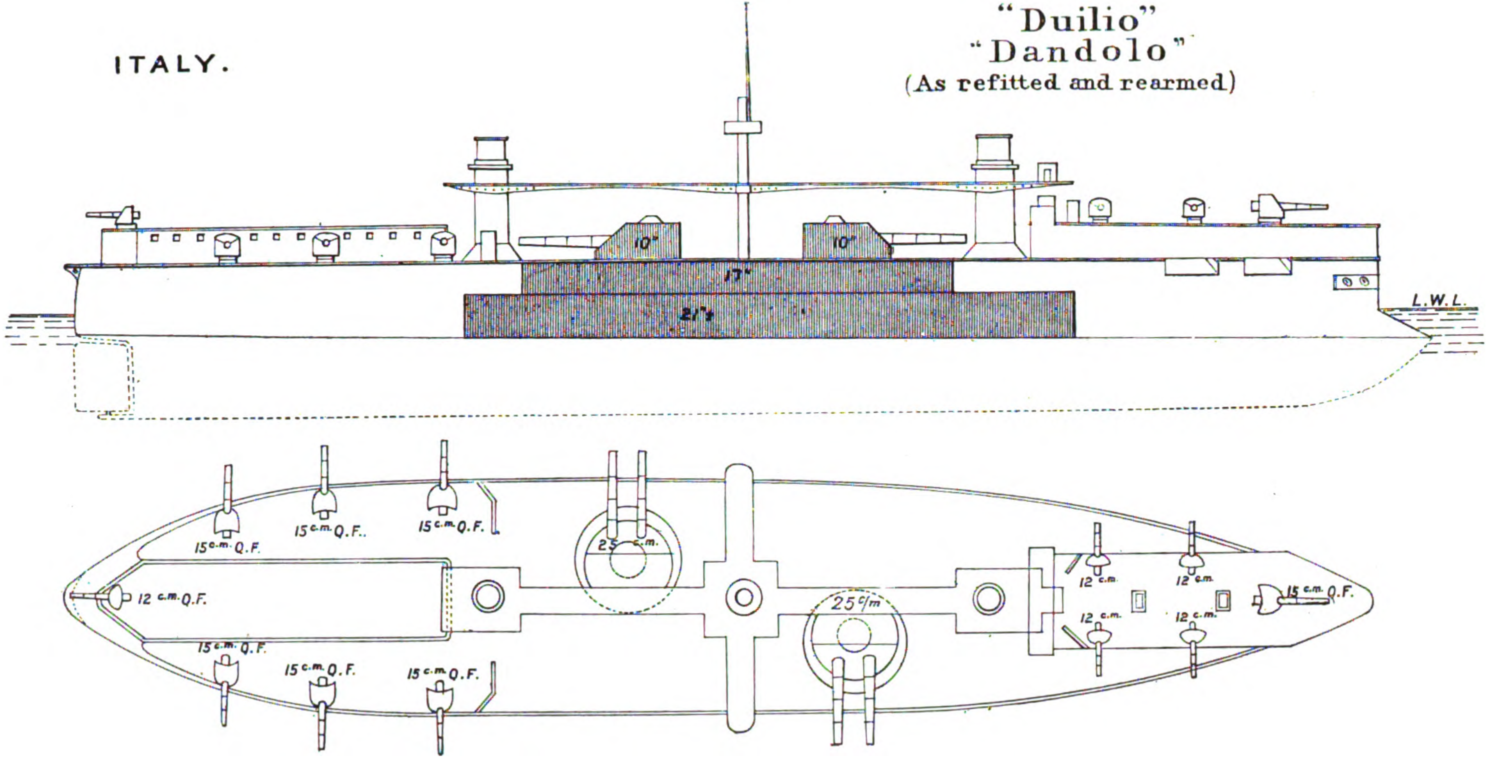


PLATE 55.

ITALY.

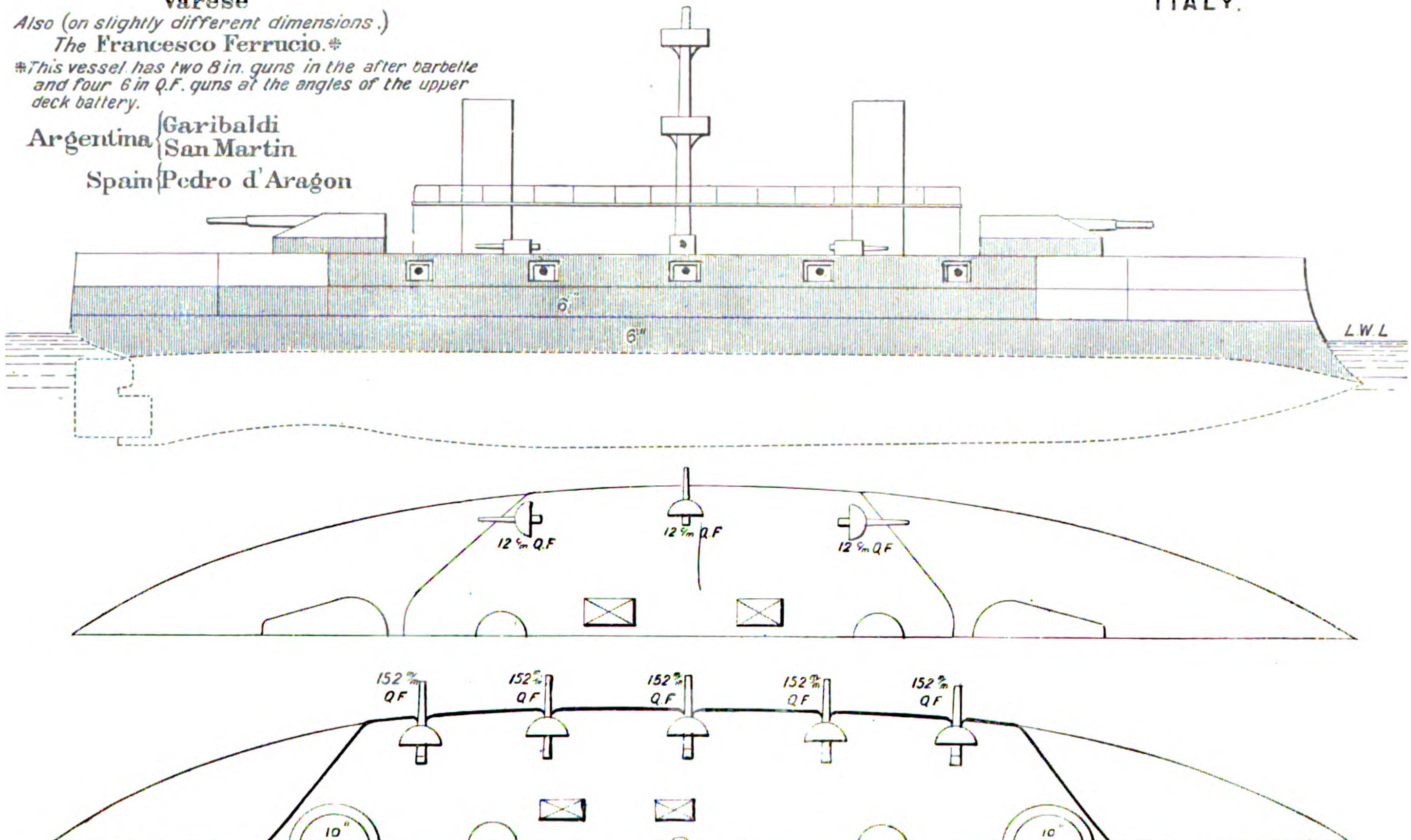
Guiseppe Garibaldi
Varese

Also (on slightly different dimensions.)
The **Francesco Ferrucio.** *

This vessel has two 8 in. guns in the after barbette and four 6 in Q.F. guns at the angles of the upper deck battery.

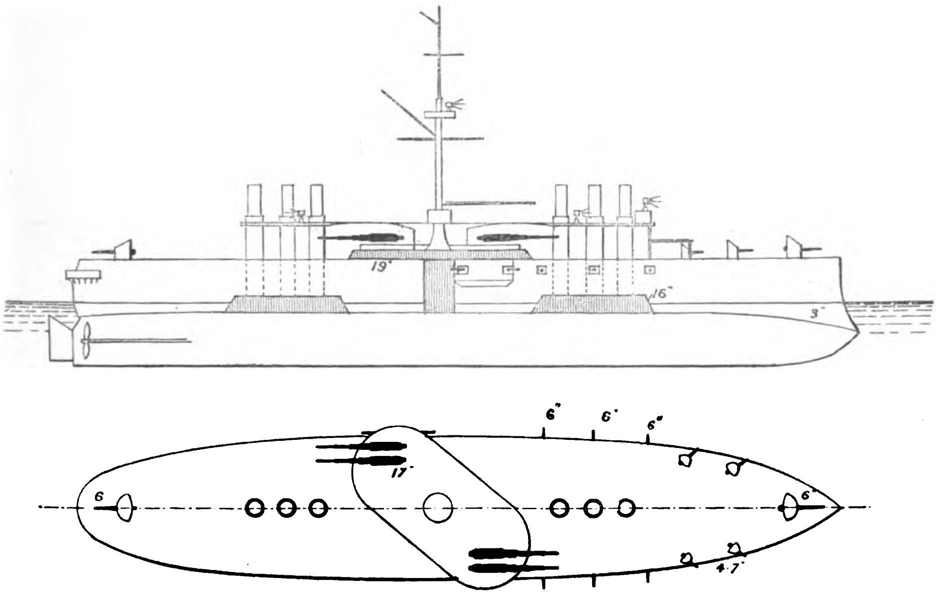
Argentina { Garibaldi, San Martin

Spain { Pedro d'Aragon

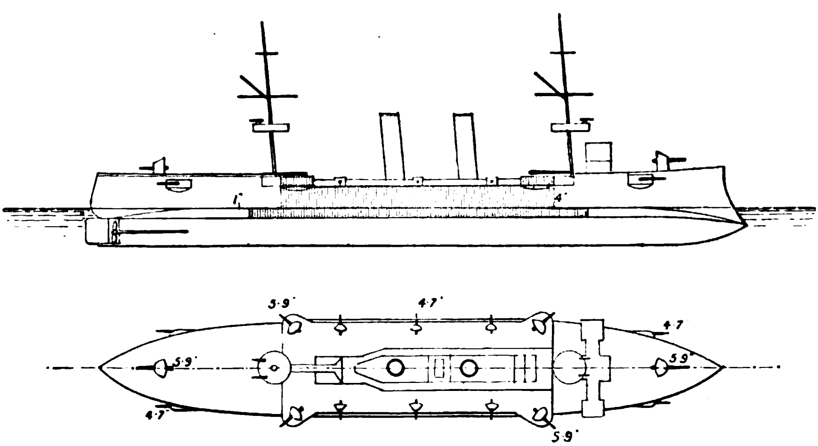


ITALY.

Italia.
Lepanto.

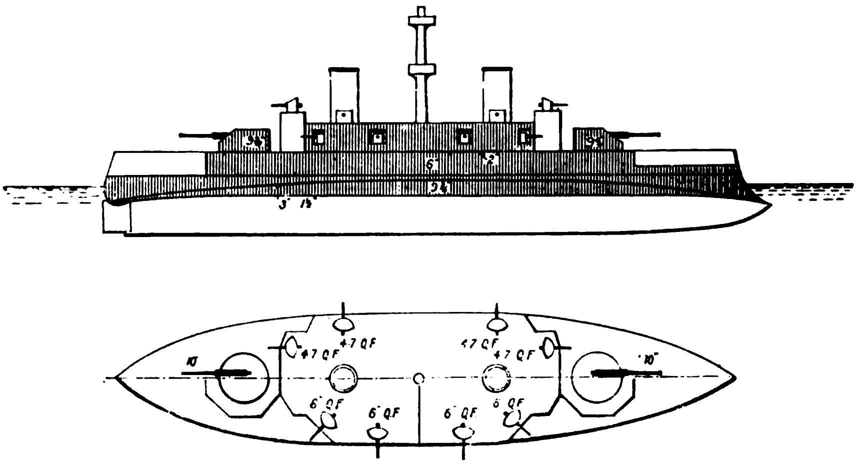


Marco Polo.

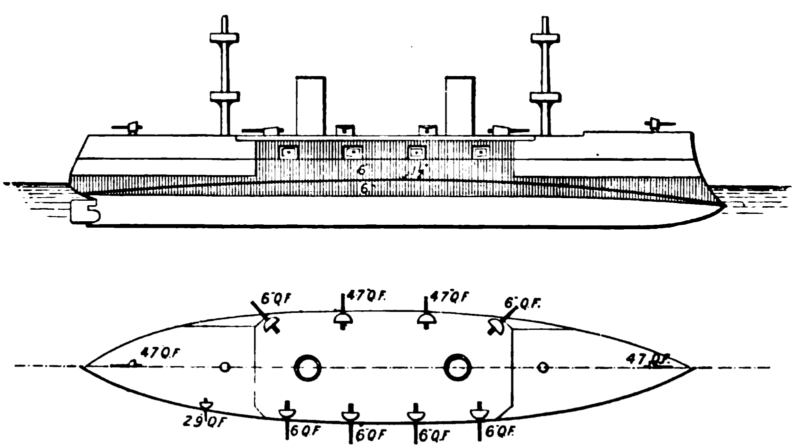


ITALY.

Ammiraglio Di St. Bon. Emanucle Filiberto

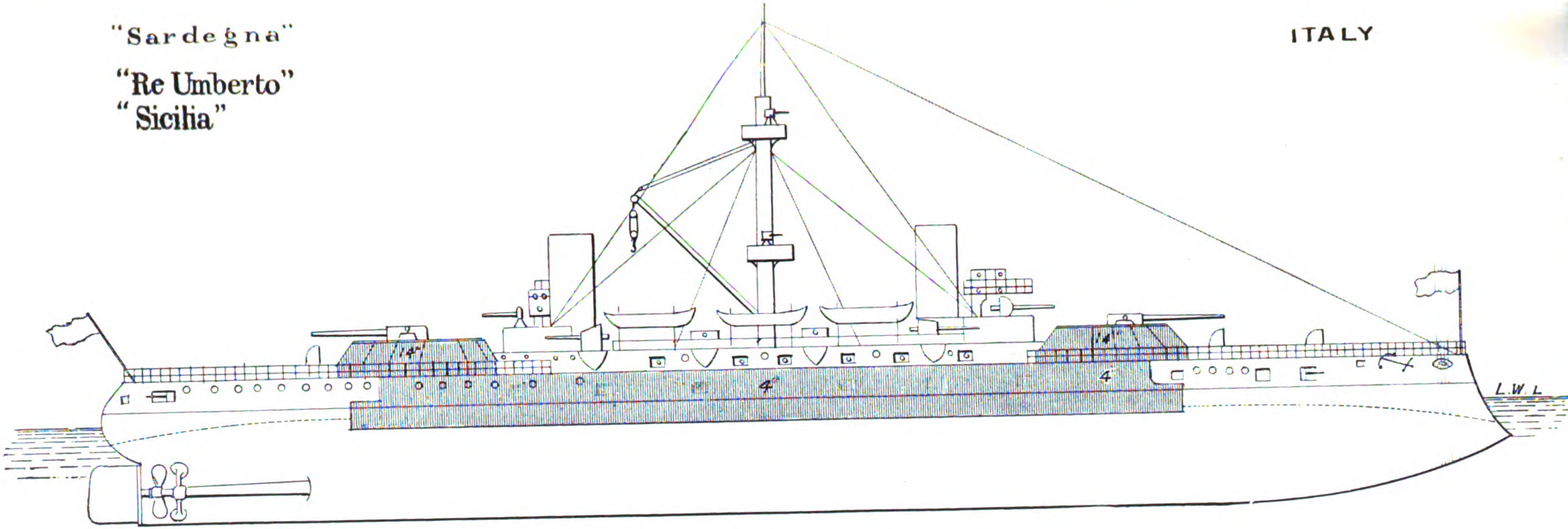


"Carlo Alberto" "Vettor Pisani"

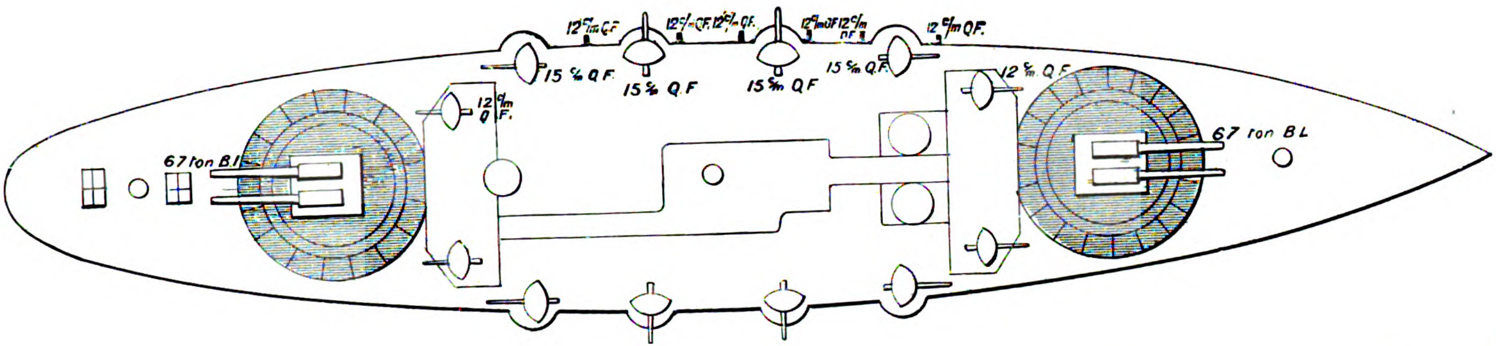


"Sardegna"

"Re Umberto"
"Sicilia"

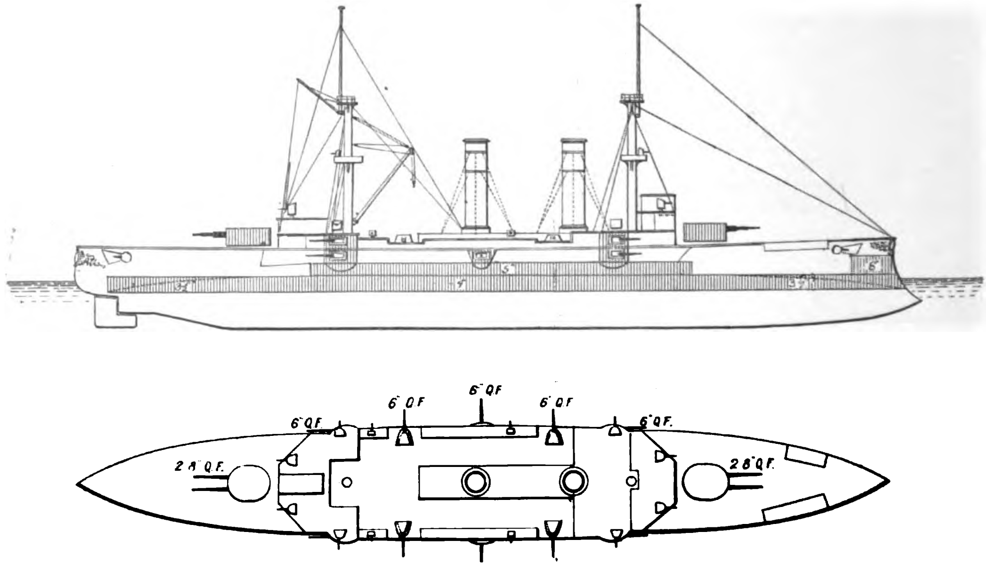


Note. *Sardegna is 9 ft. 10 in. longer and 3 ft. 3 in. broader than the other two.*

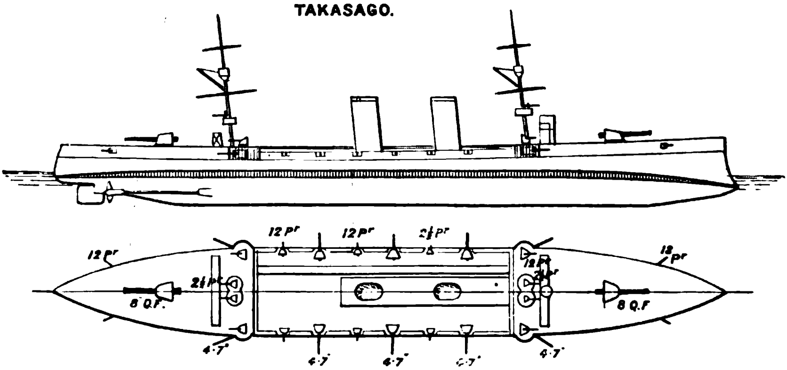


JAPAN.

Asama and Tokiwa



TAKASAGO.



JAPAN.

"Chin Yuen"

Taken from the Chinese

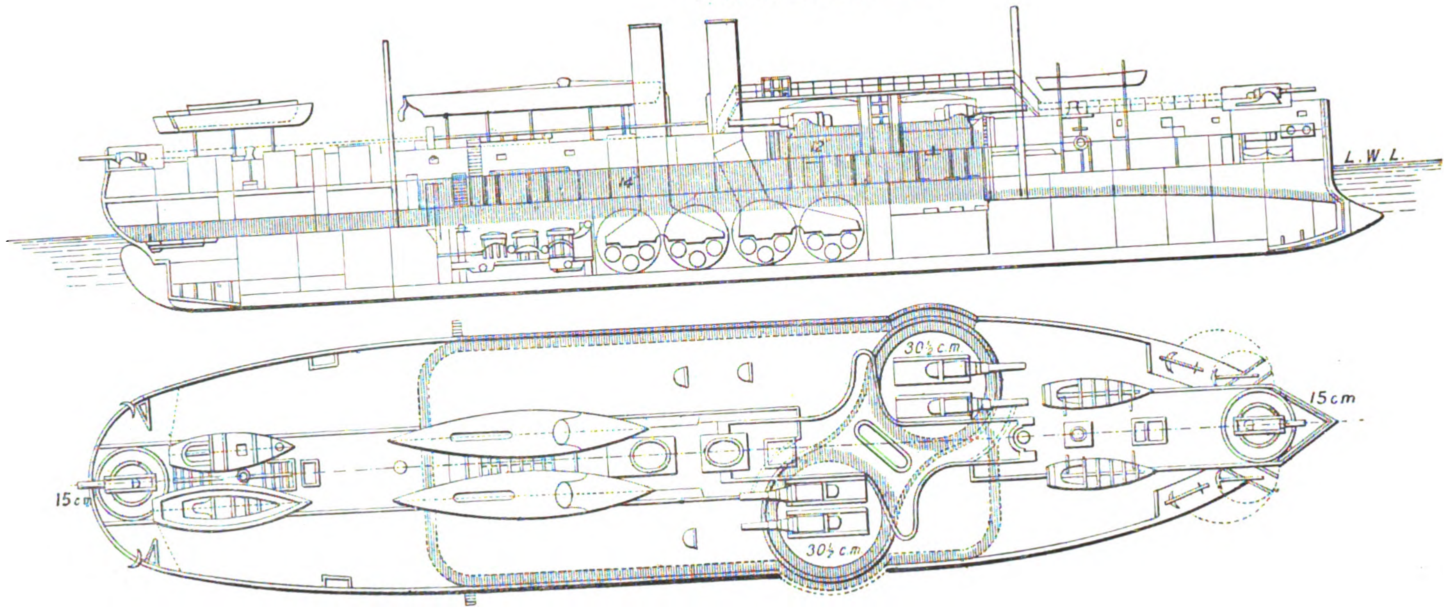


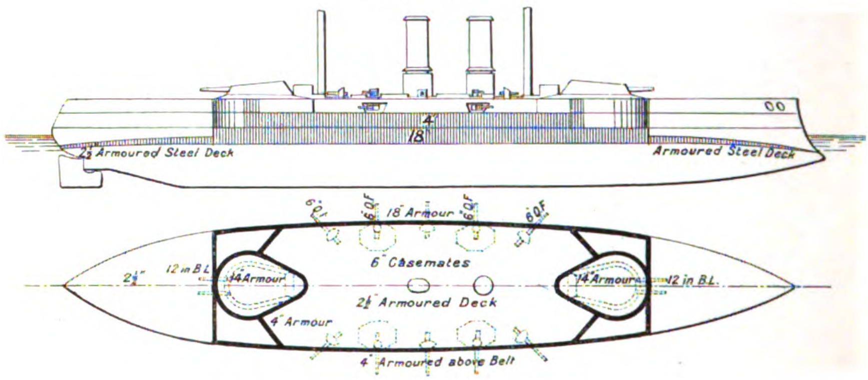
PLATE 61.

JAPAN

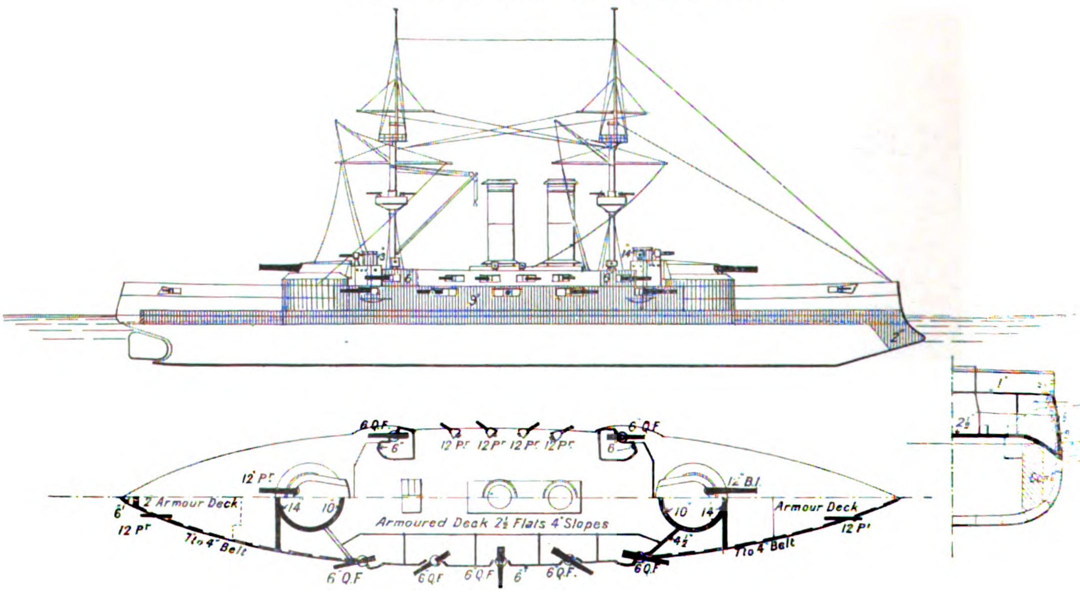
First Class Battleship

"Fuji."

"Yashima".



Japanese **Battleship** building at Barrow.



JAPAN.

"Itsukusima"
"Hashidate"

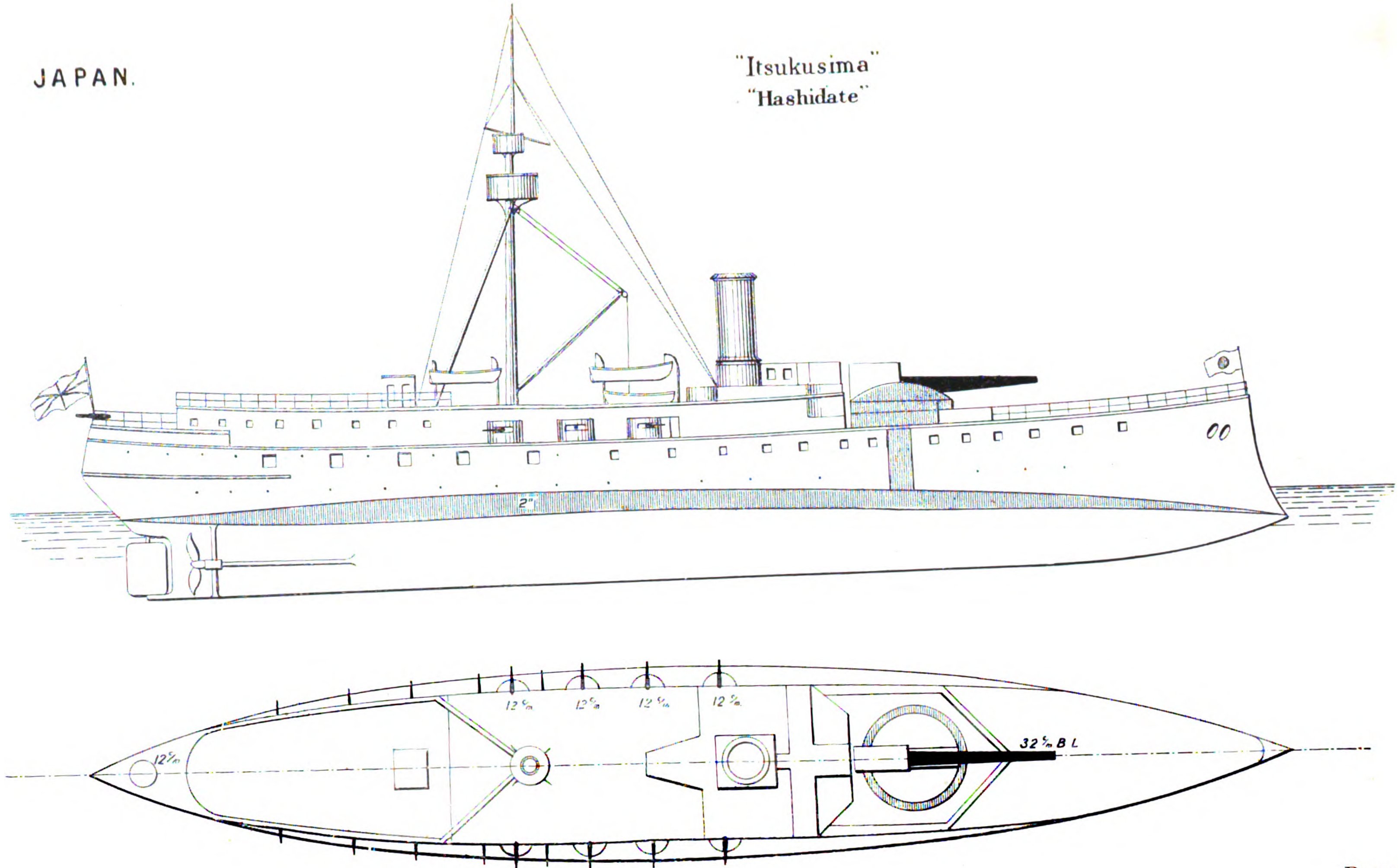


PLATE 63.

Japan.

"Shikishima"

14.850 Tons. 14.500 IHP.
Building at the Thames Iron Works.

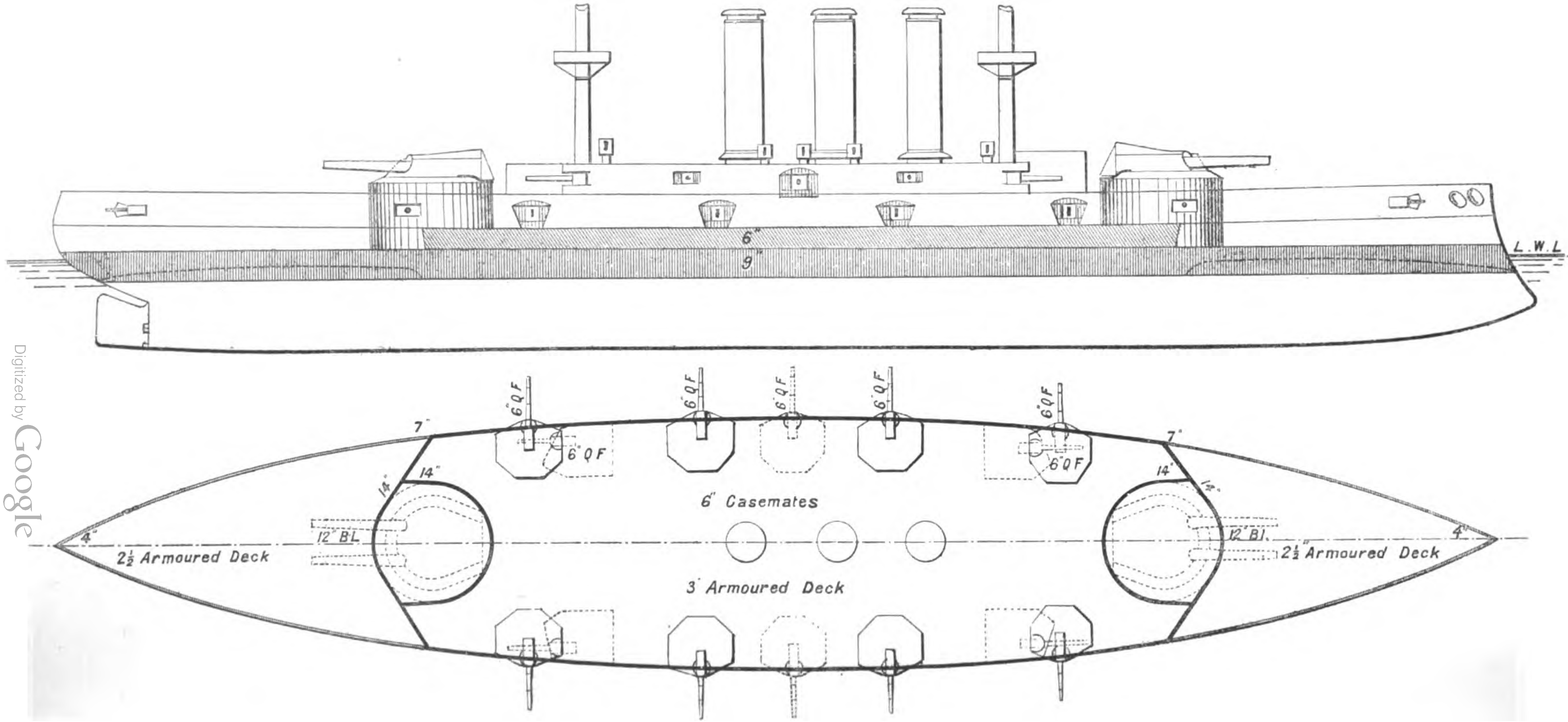
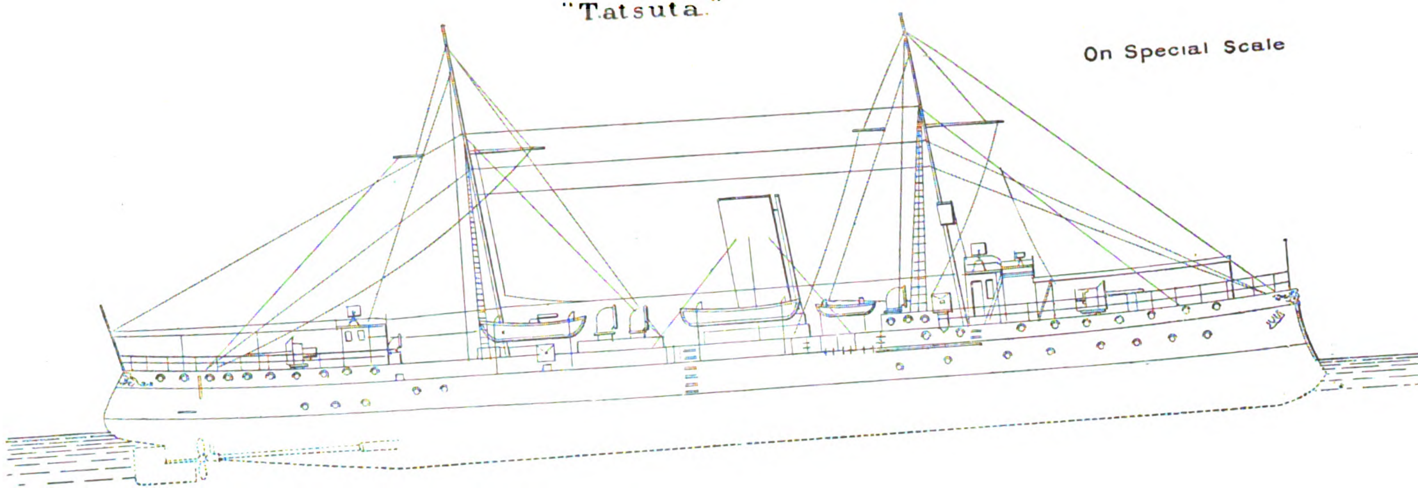


PLATE 64.

JAPAN

"Tatsuta."

On Special Scale



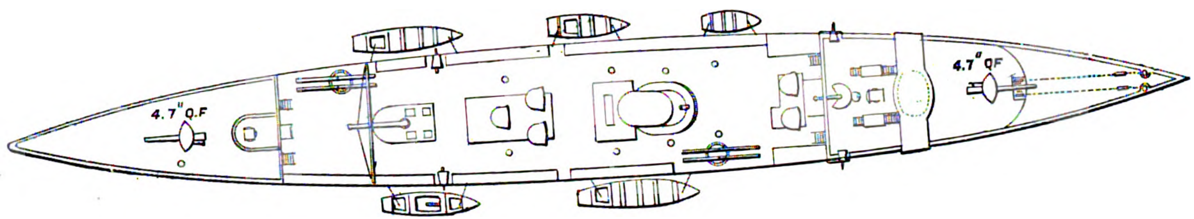
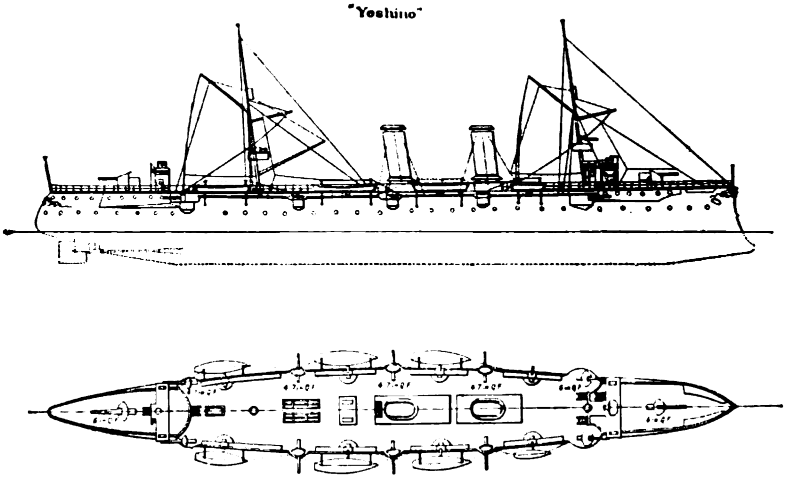


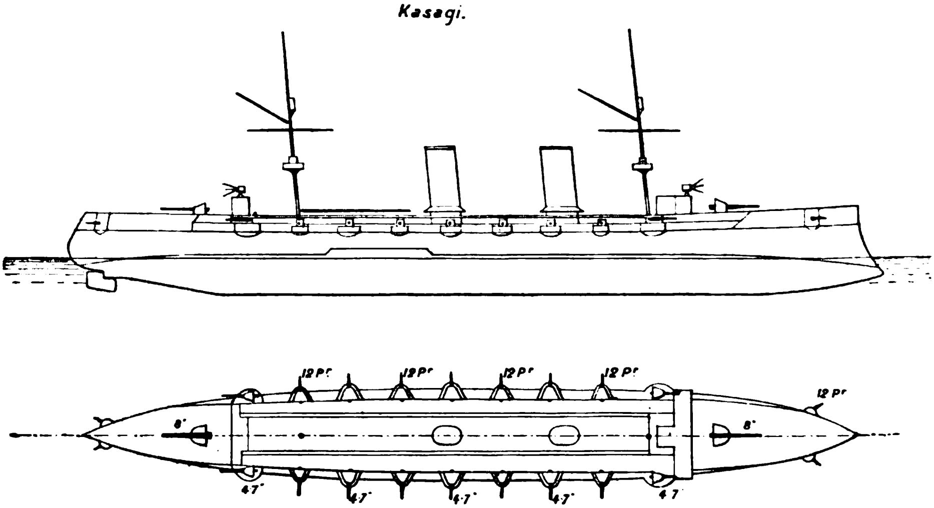
PLATE 65.

JAPAN

"Yoshino"

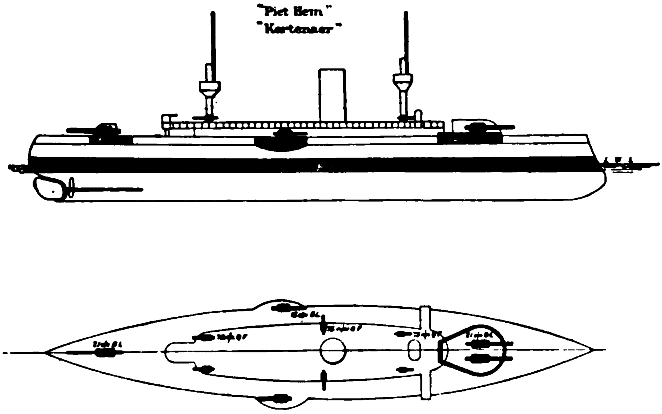


Kasagi.



NETHERLANDS.

"Evertsen"
"Piet Hein"
"Kortenaer"



Koningin Wilhelmina de Nederlanden

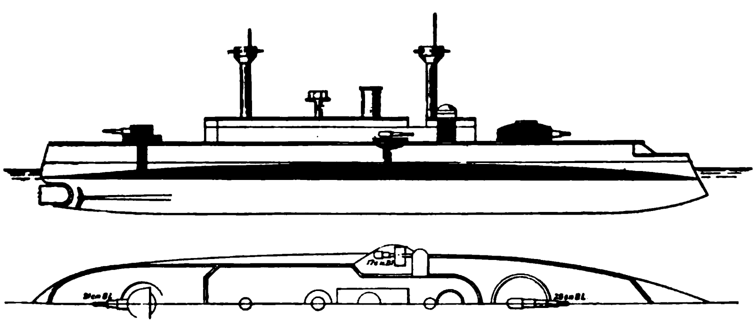
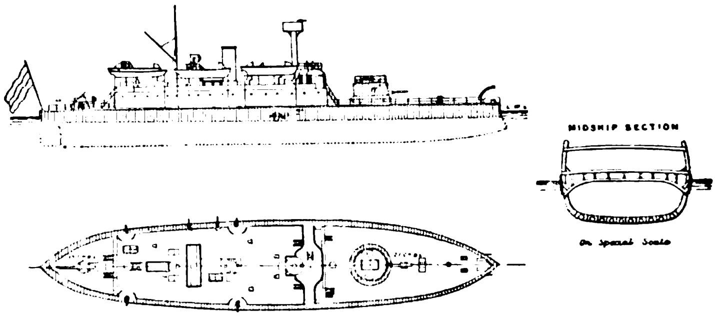


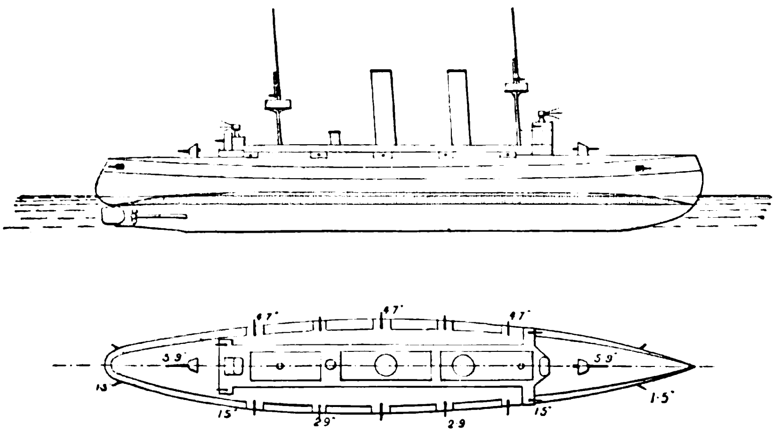
PLATE 67.

NETHERLANDS

"Reinier Claesen"



Holland



RUSSIA

"Admiral Nachimoff"

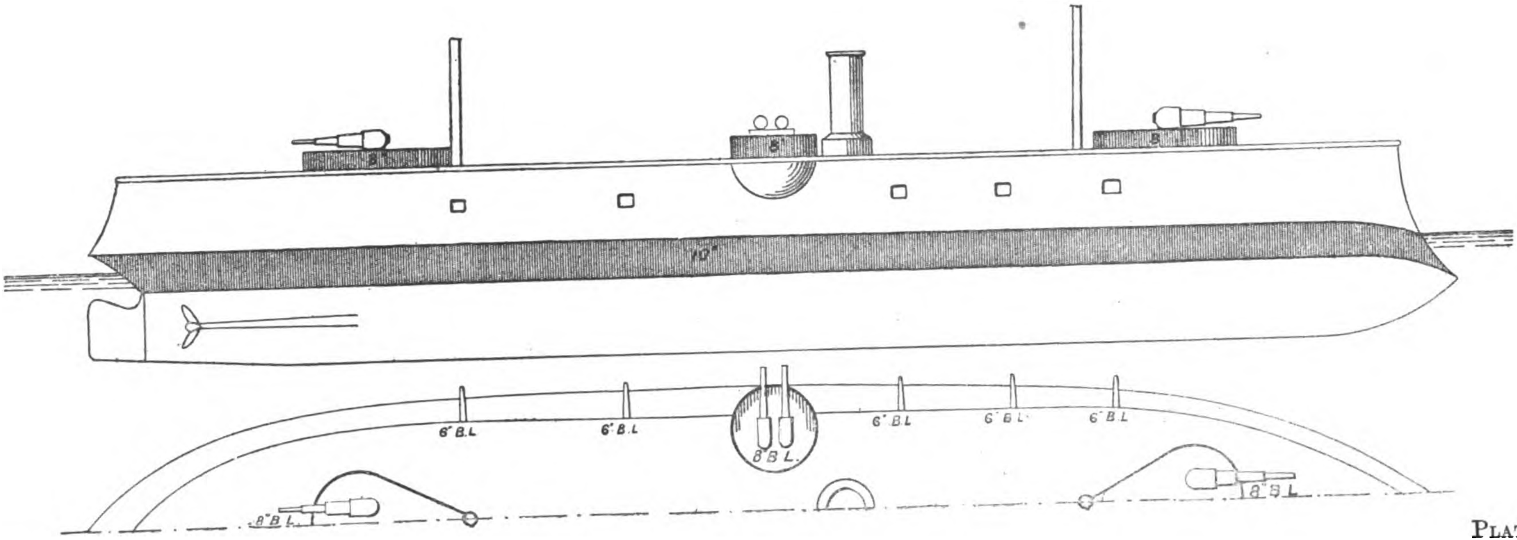
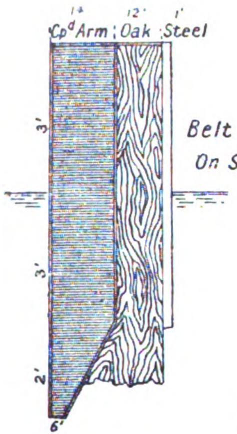


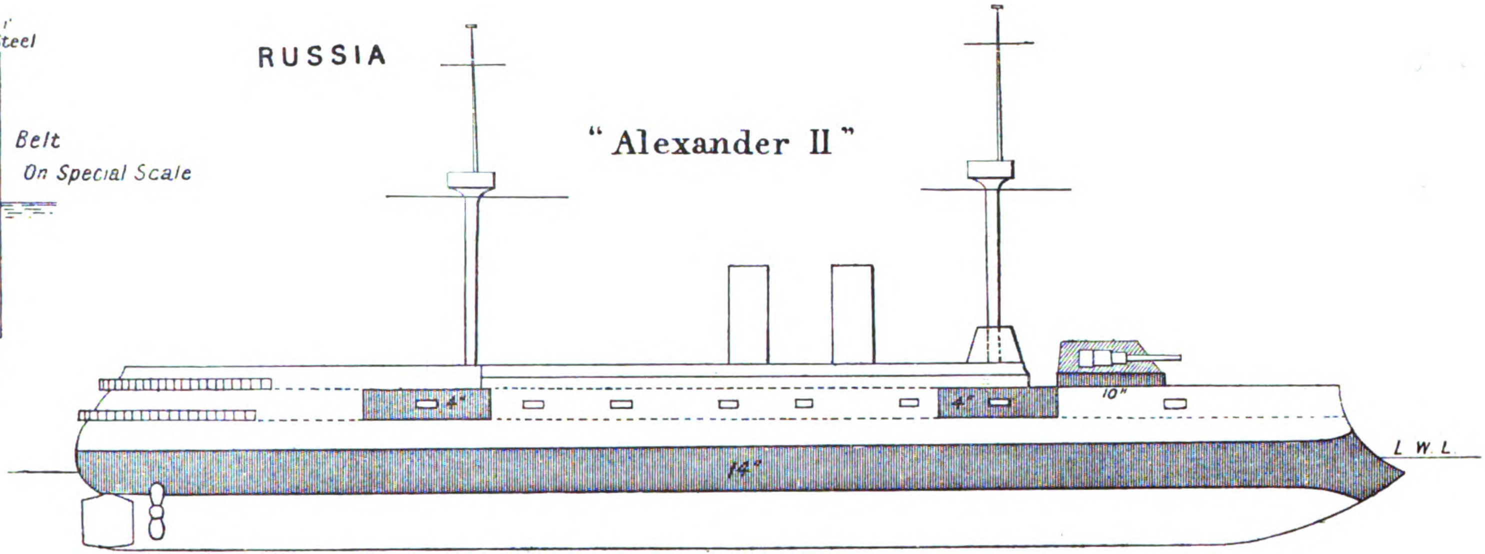
PLATE 69.

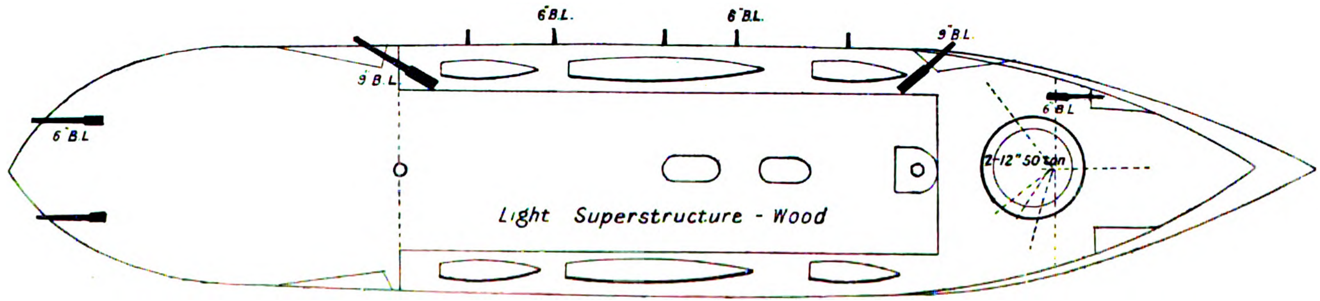


Belt
On Special Scale

RUSSIA

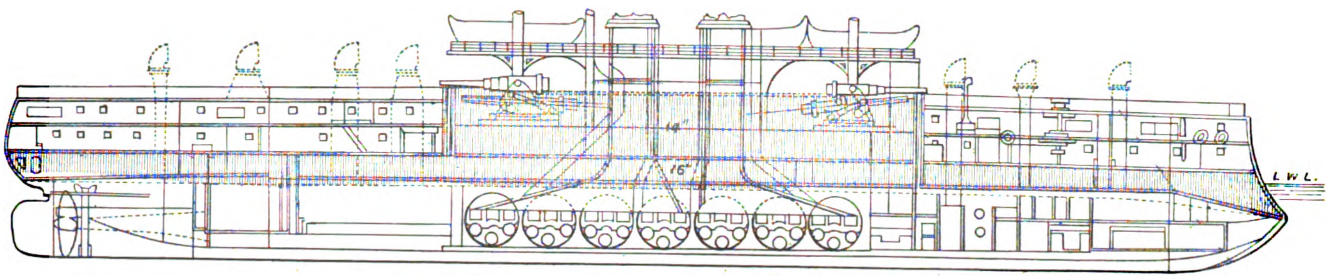
"Alexander II"





RUSSIA.

"Catherine II."
"Tchsmé."
"Sinope."



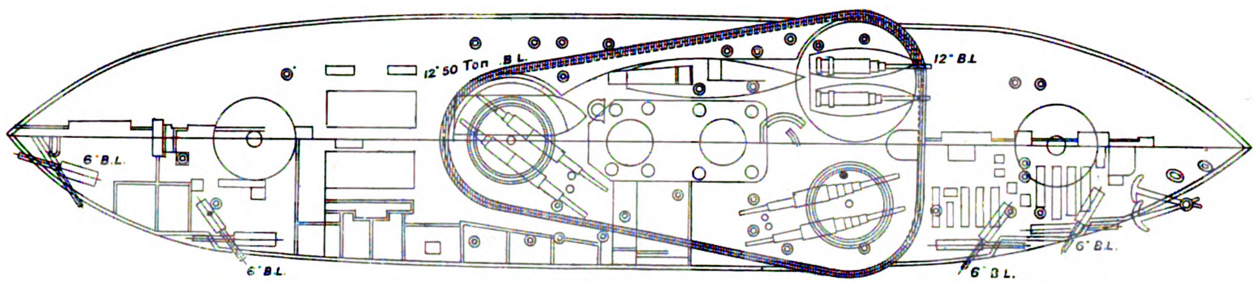


Plate 71.

RUSSIA

"Nicolai I."

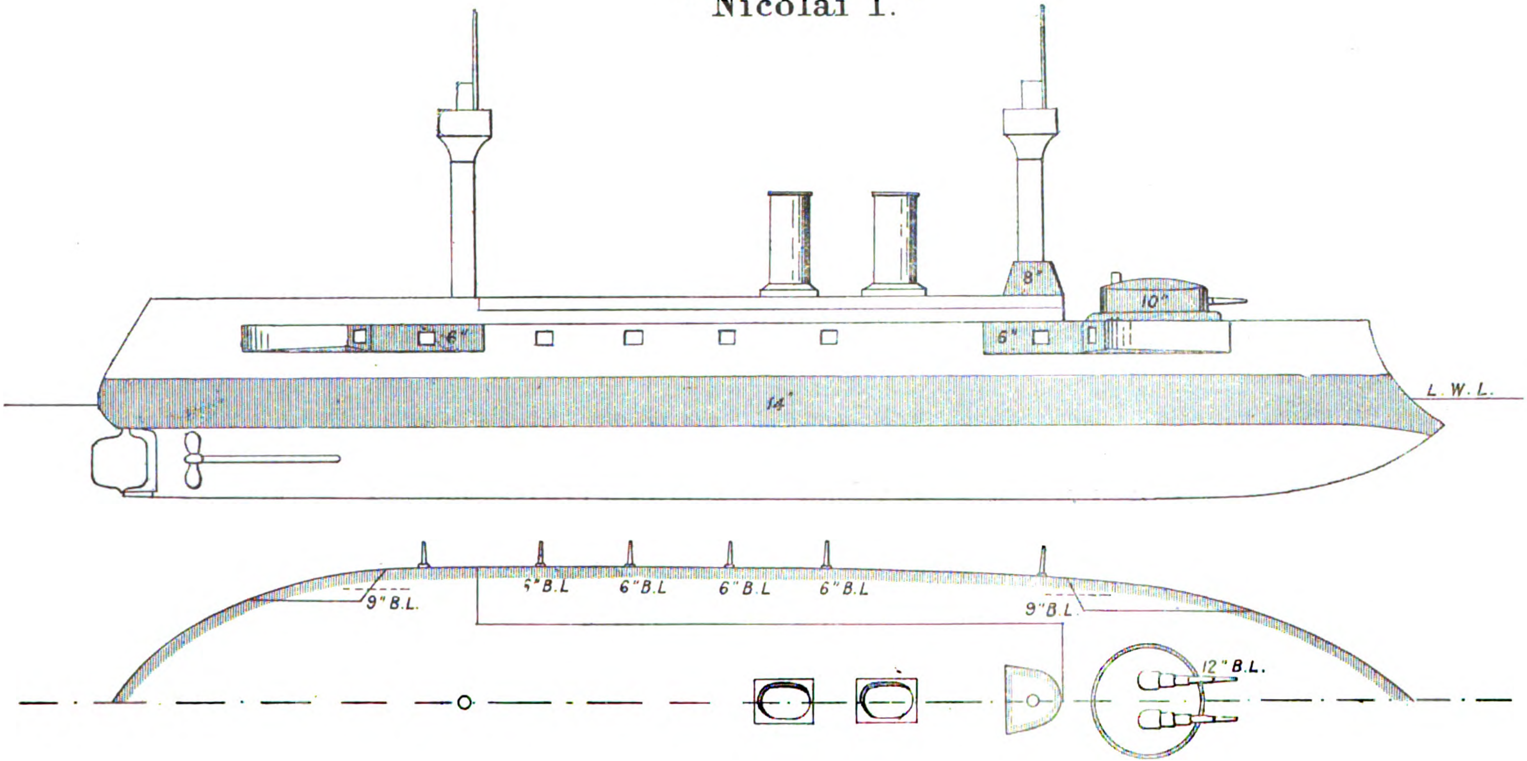


Plate 72.

RUSSIA

"Pamyat Azova."

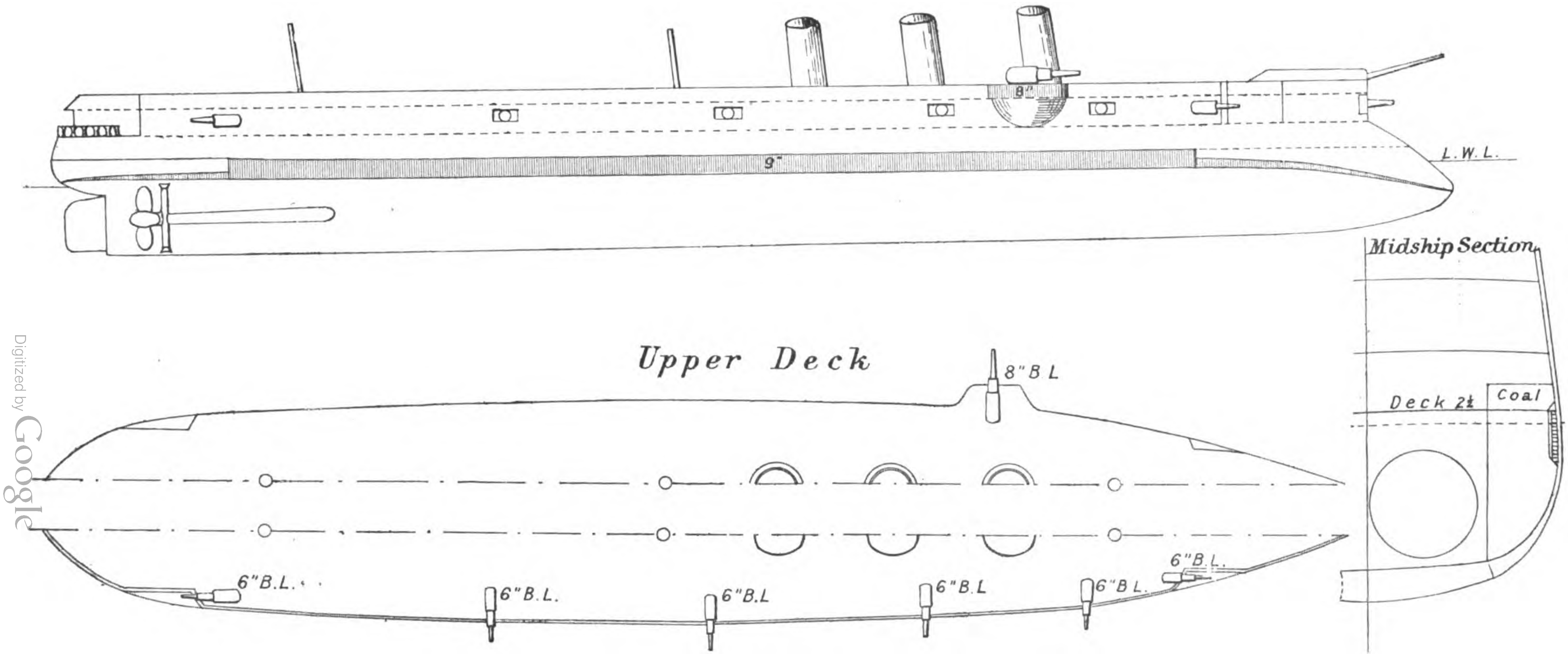
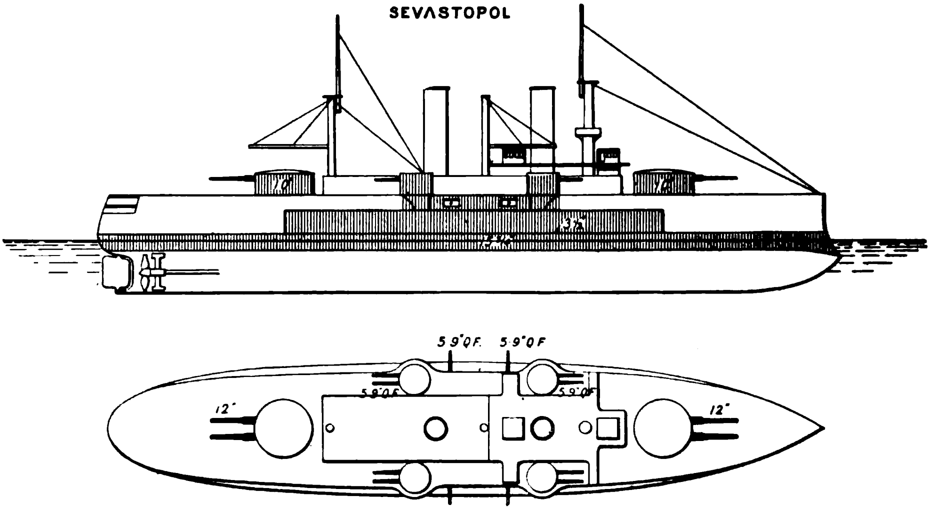


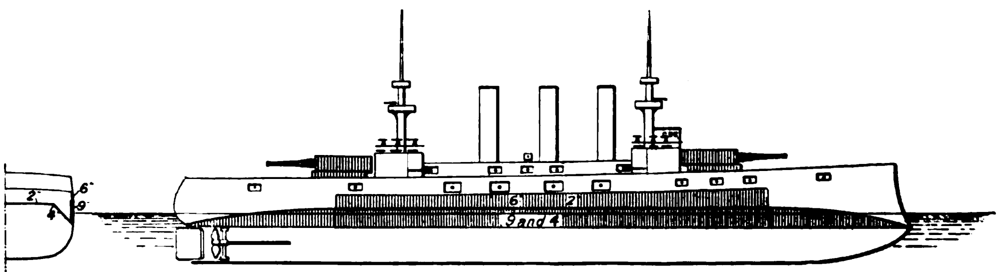
PLATE 73.

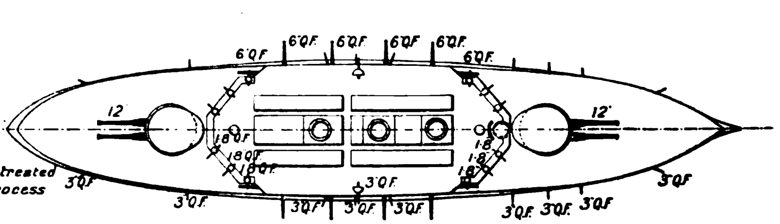
RUSSIA.

PETROPAVLOVSK
POLTAVA
SEVASTOPOL



"Retwisan"

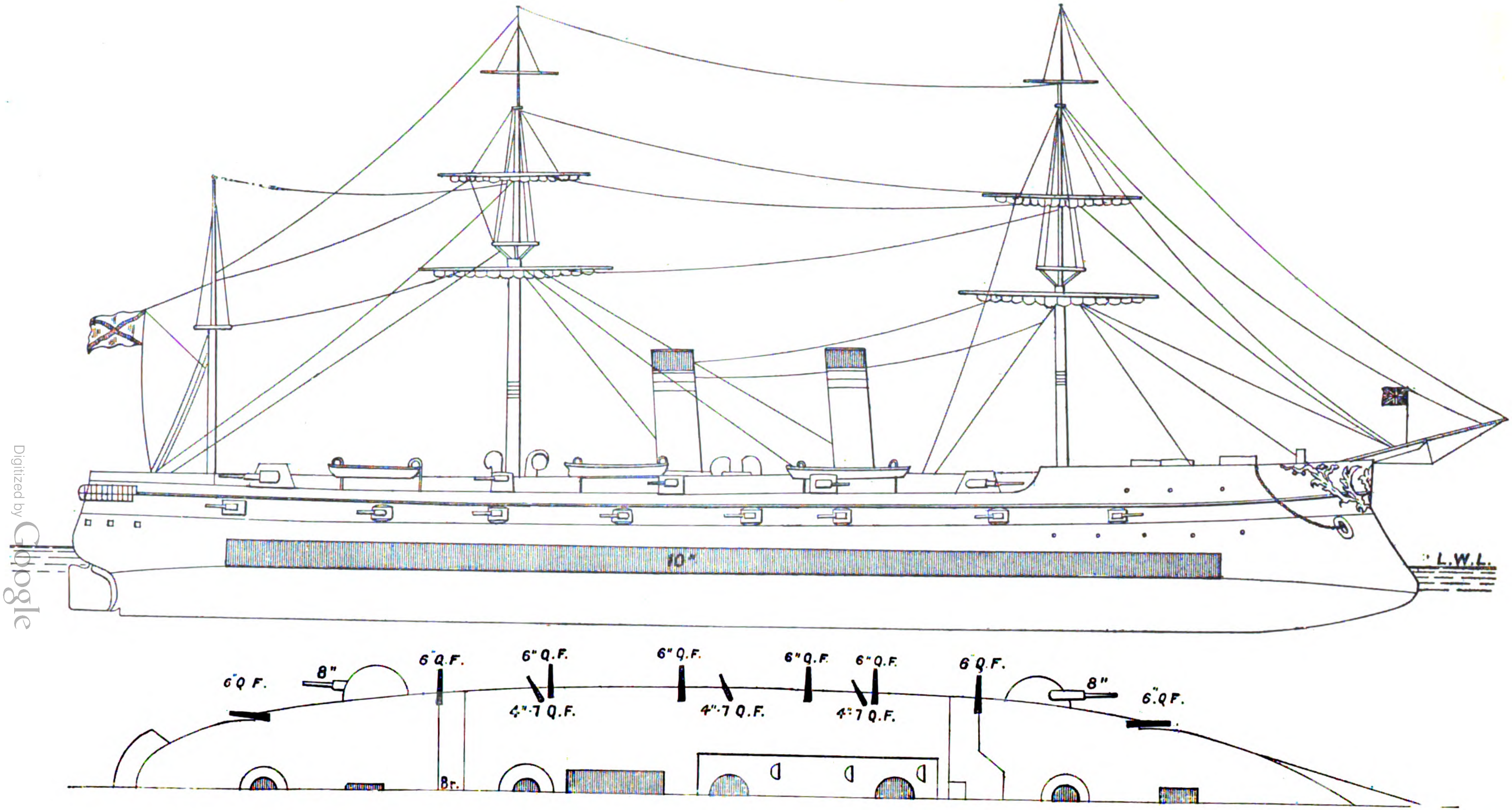




N.B. All Armour treated by Krupp Process

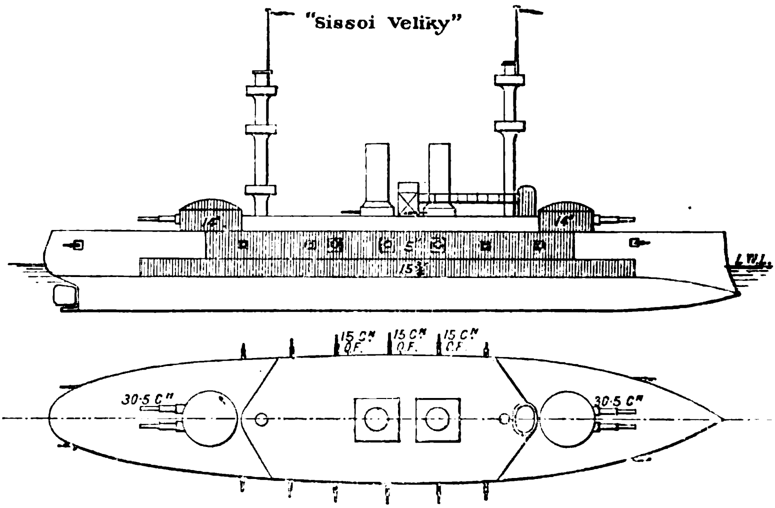
Plate 74.

First Class Cruiser "Rurik."

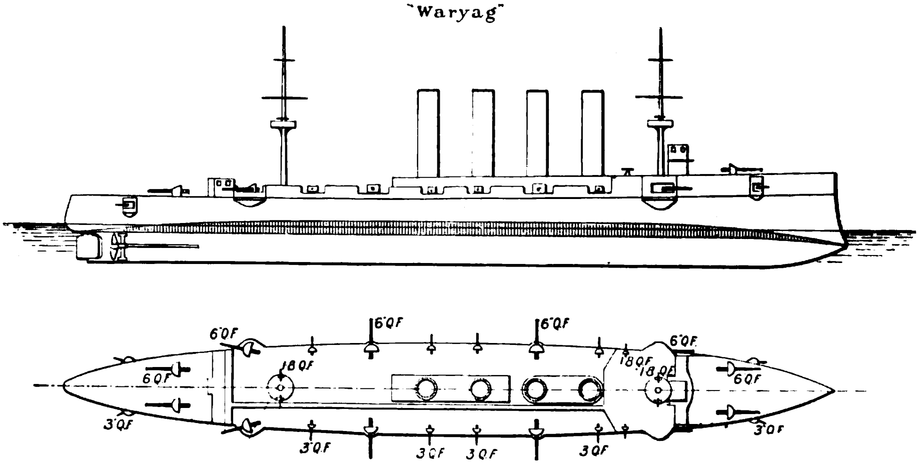


RUSSIA

"Sissoi Veliky"



"Waryag"



RUSSIA.

"Tria Sviatitelia"

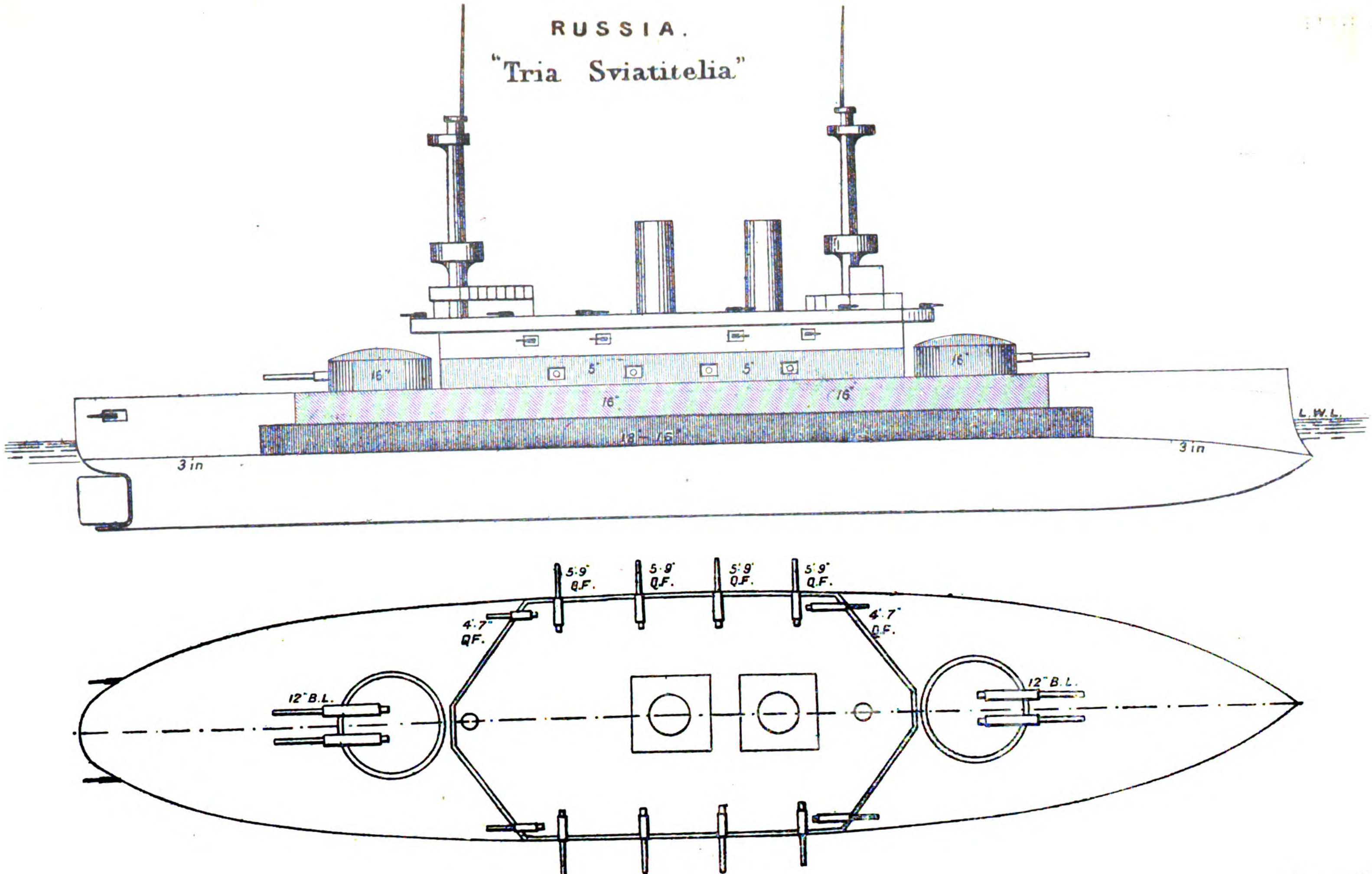
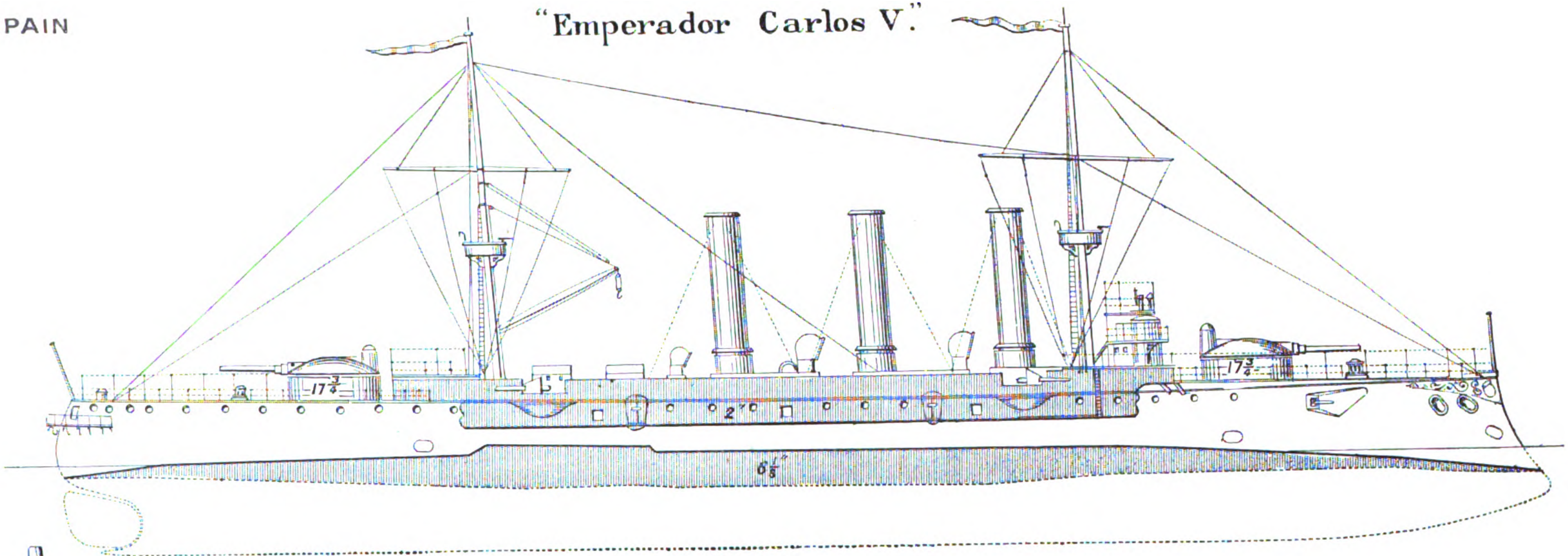
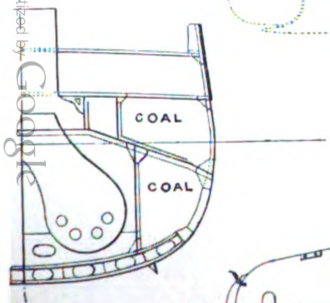


PLATE 77.

SPAIN

"Emperador Carlos V."





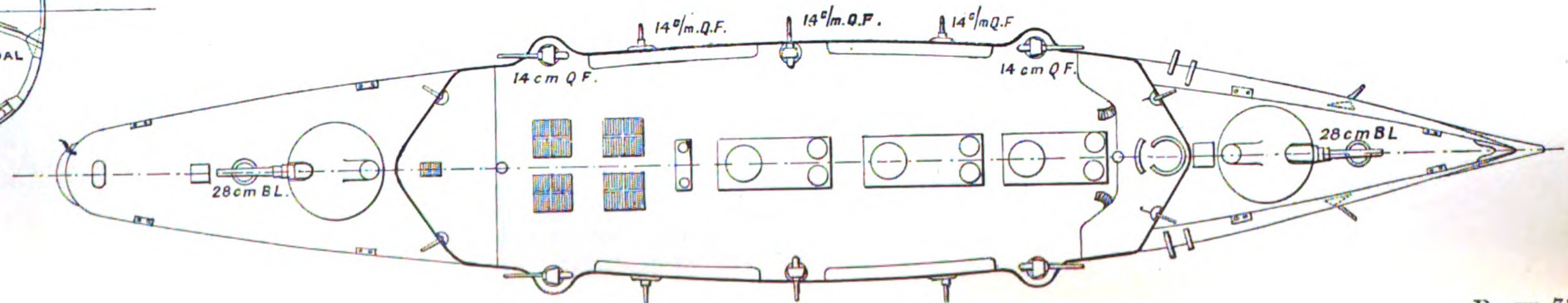


PLATE 78.

SPAIN

"Almirante Oquendo"
"Catalīna"
"Cardenal Cisneros"
"Infanta Maria Téresa"
"Princessa de Asturias"
"Vizcaya"

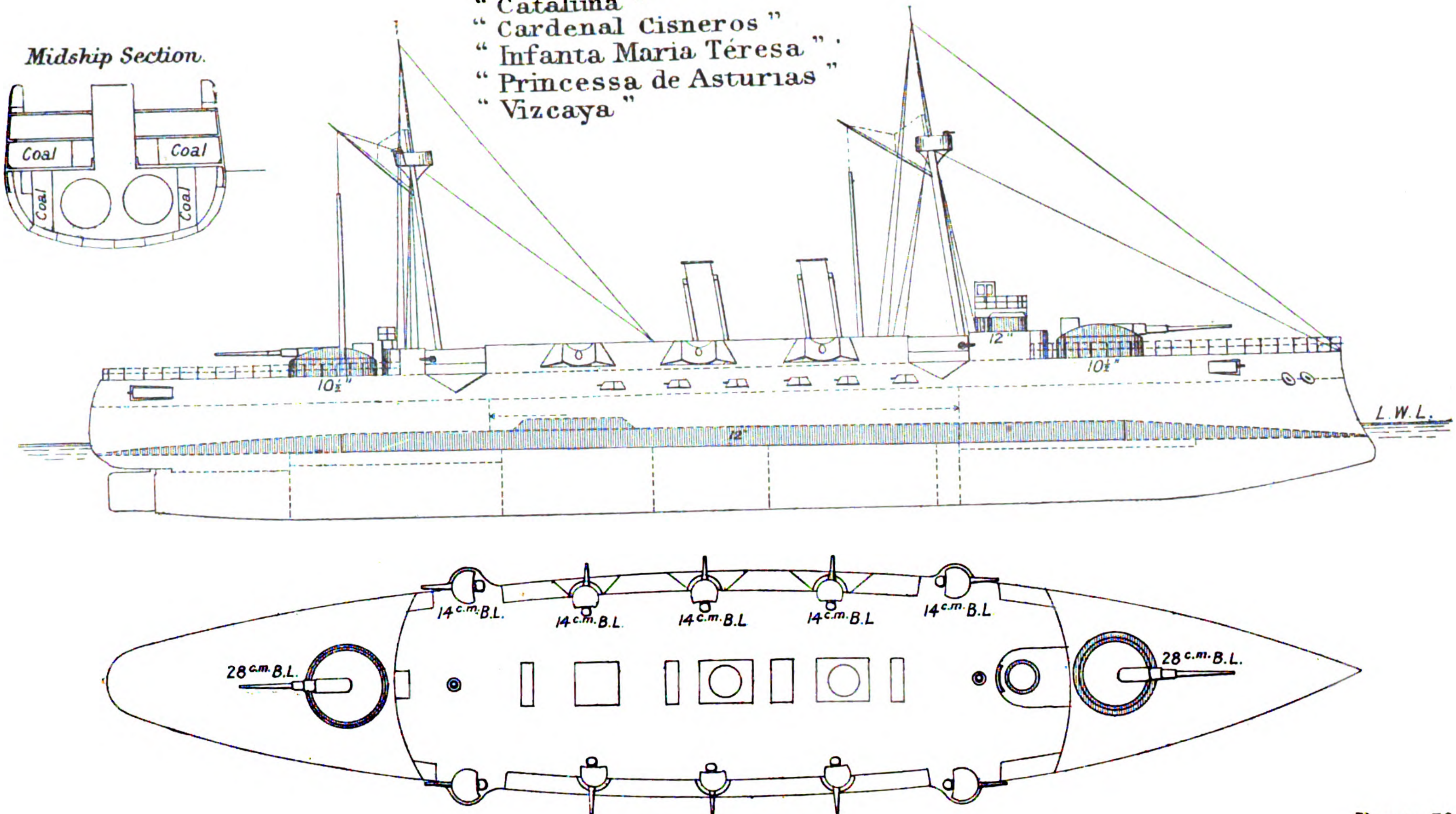
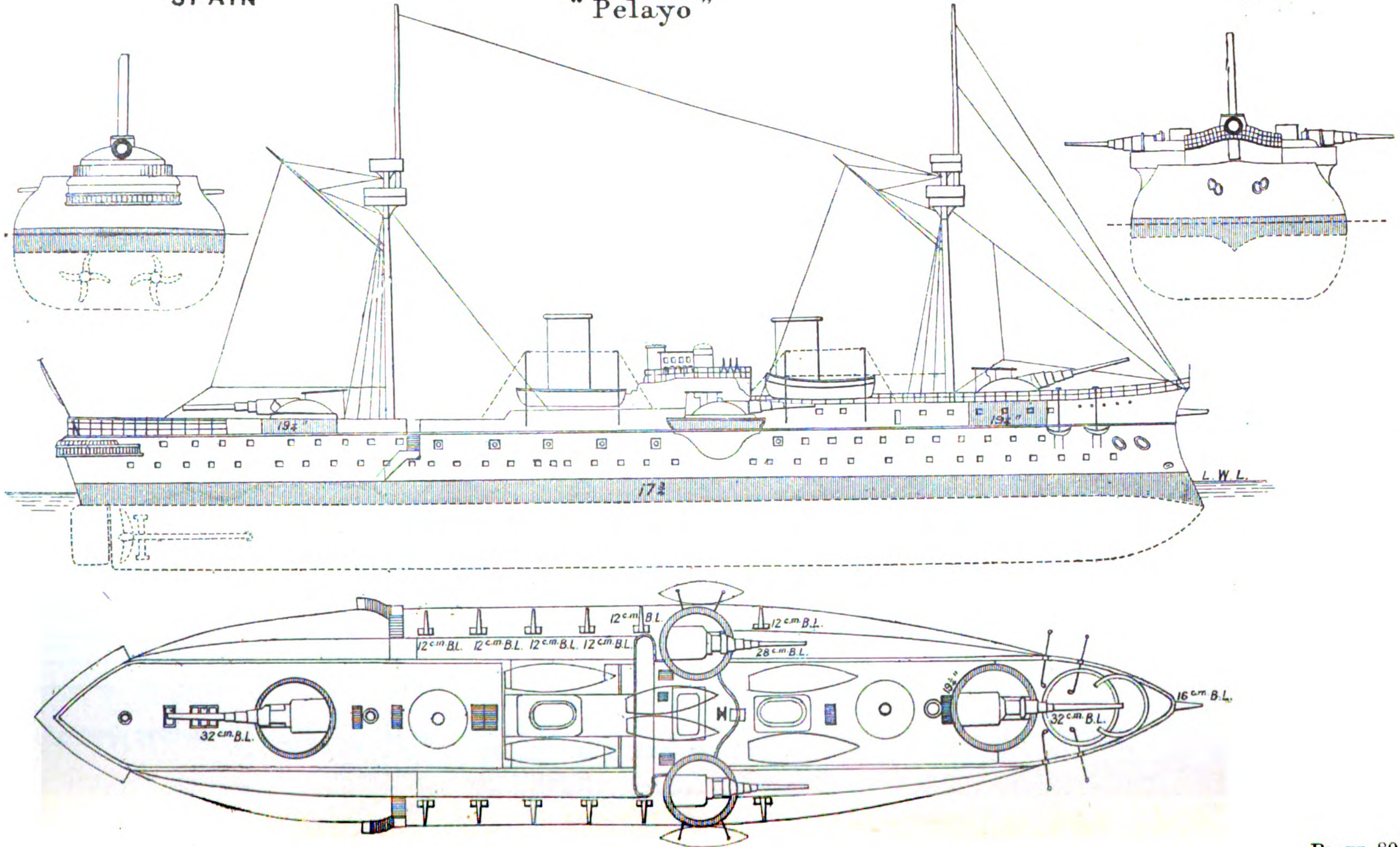


PLATE 79.

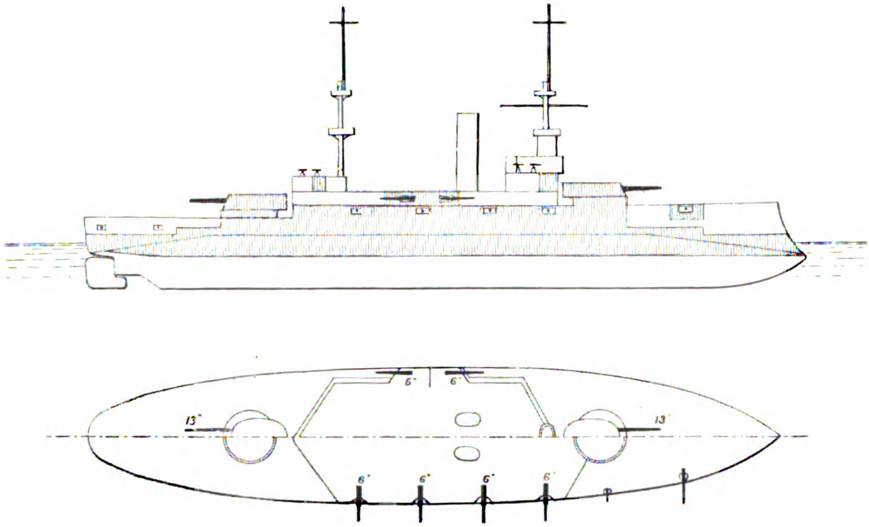
SPAIN

"Pelayo"



UNITED STATES.

Alabama



"Brooklyn"
(Armoured Cruiser)

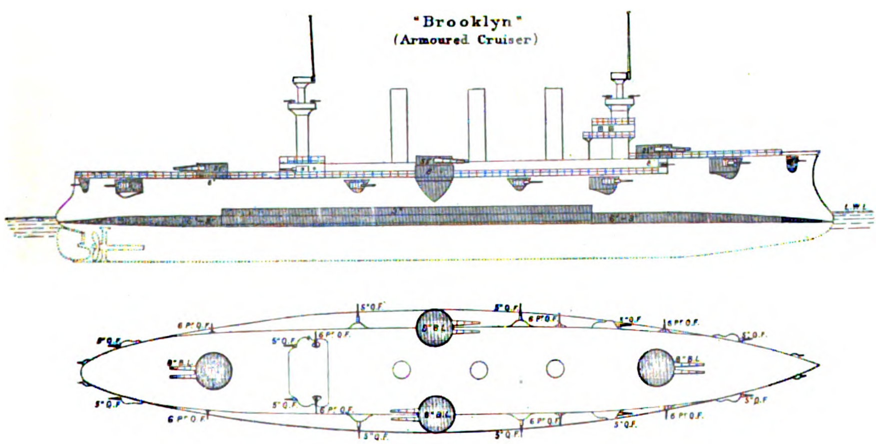


PLATE 81.

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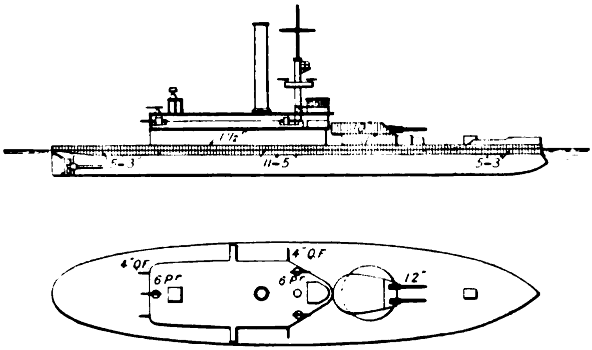
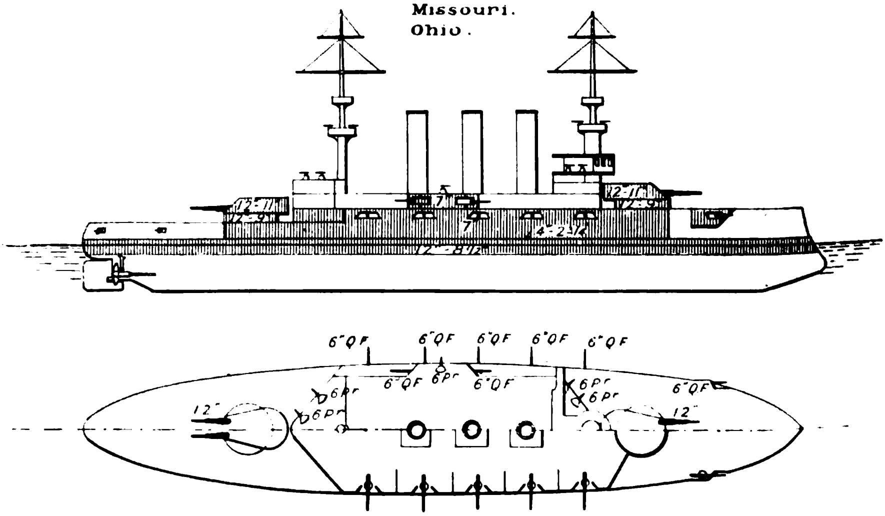
UNITED STATES.

ARKANSAS



Maine.
Missouri.
Ohio.



UNITED STATES TRIPLE SCREW PROTECTED CRUISERS COLUMBIA & MINNEAPOLIS.

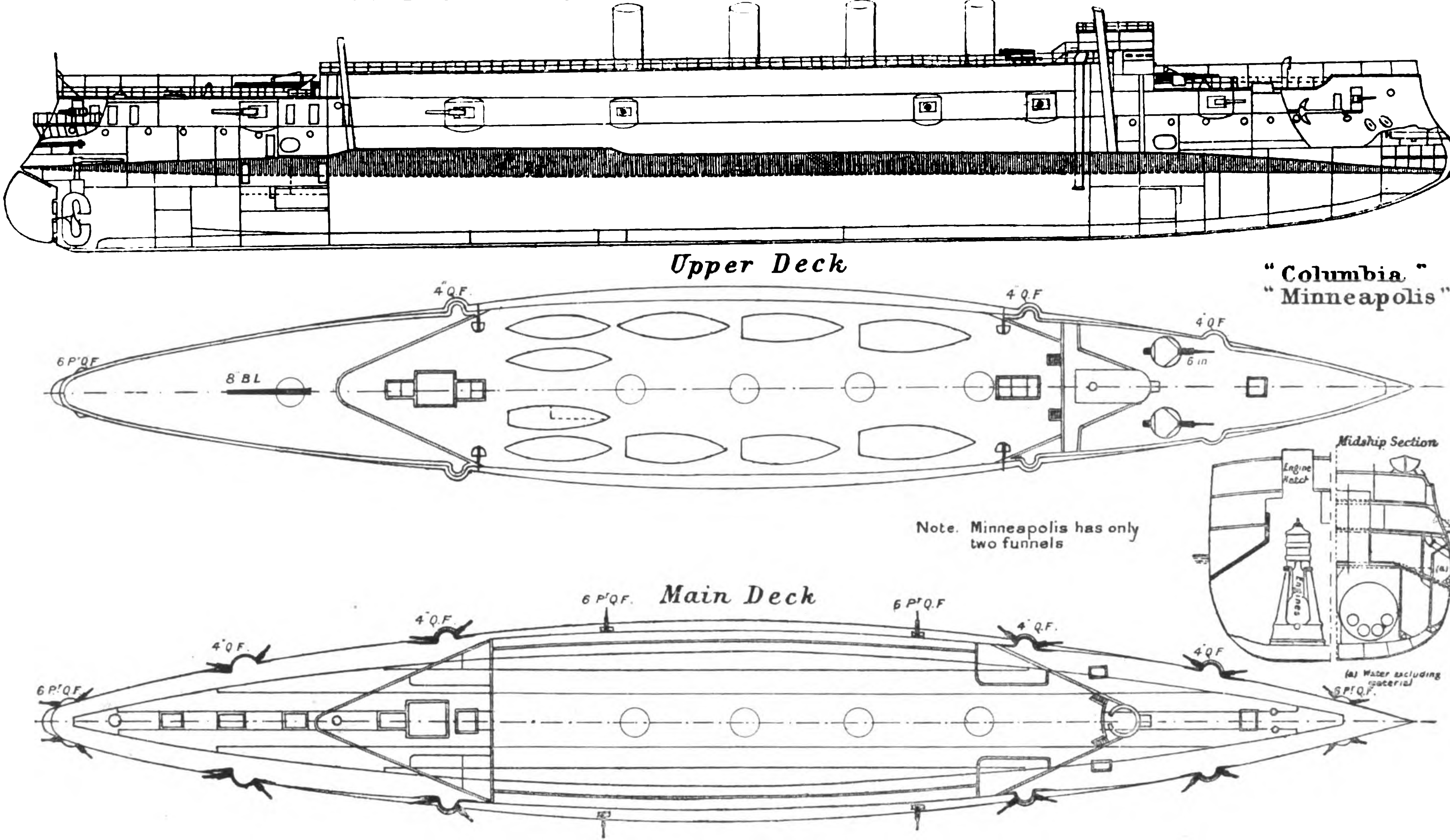
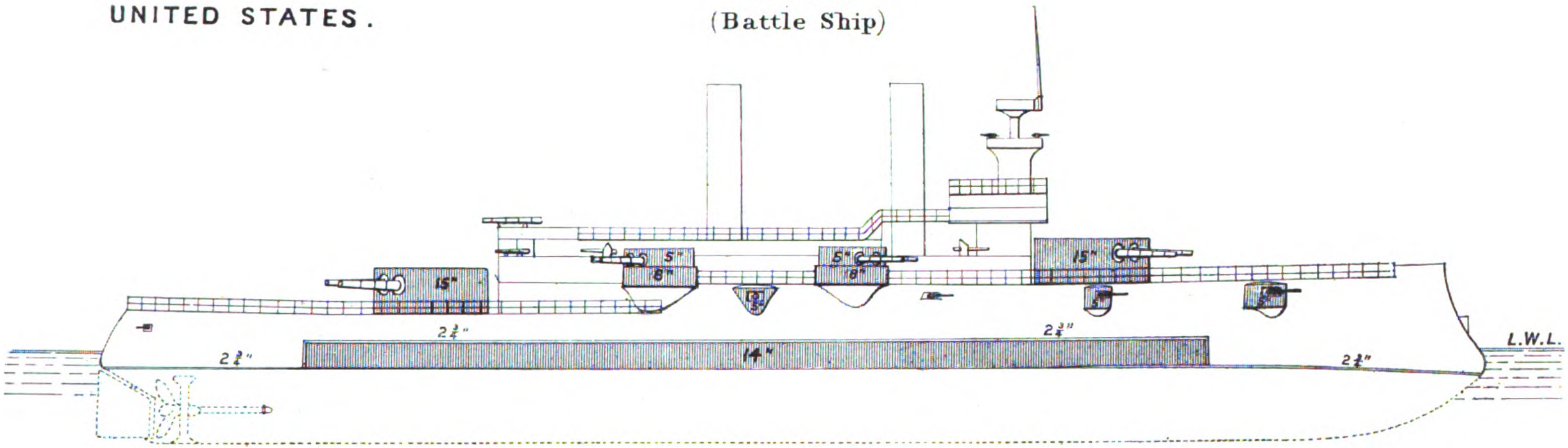
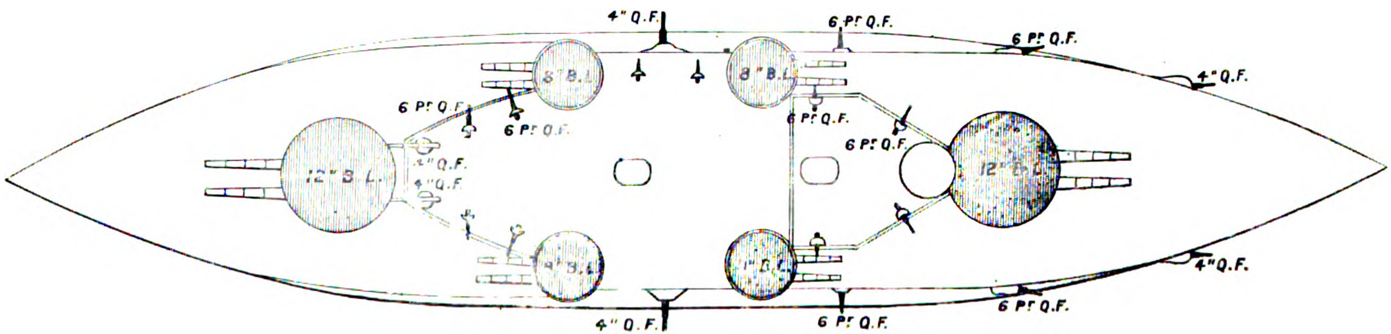


PLATE 83.

UNITED STATES.

"Iowa"
(Battle Ship)





UNITED STATES.

Nº 5 (Kearsage)
" 6 (Kentucky)
(Battle ships)

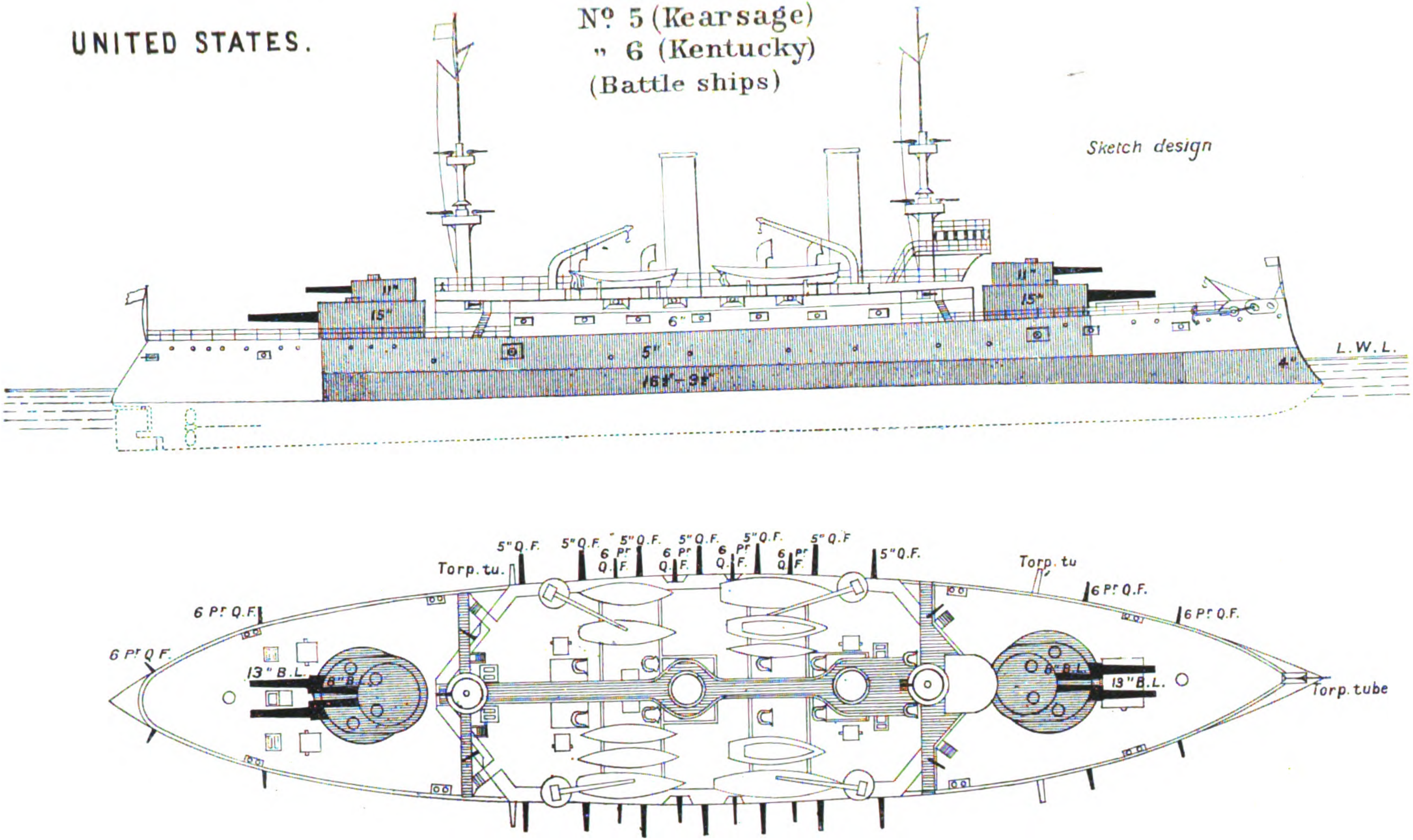
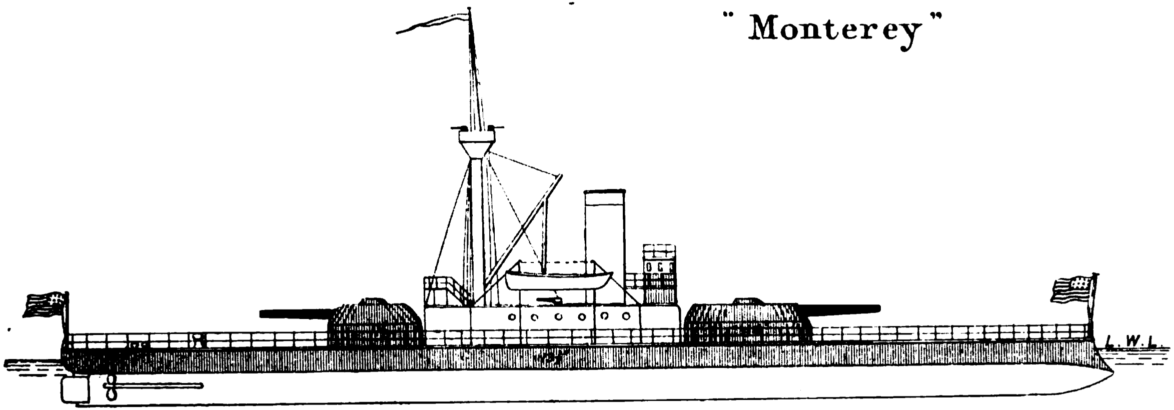
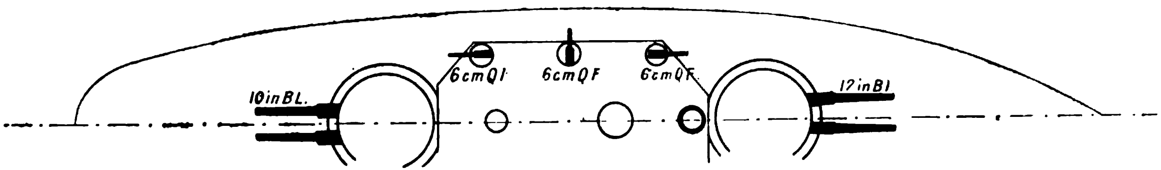


Plate 85.

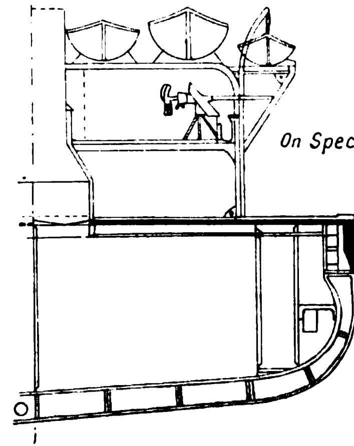
UNITED STATES

Coast Defence Ship
" Monterey "





Midship Section.

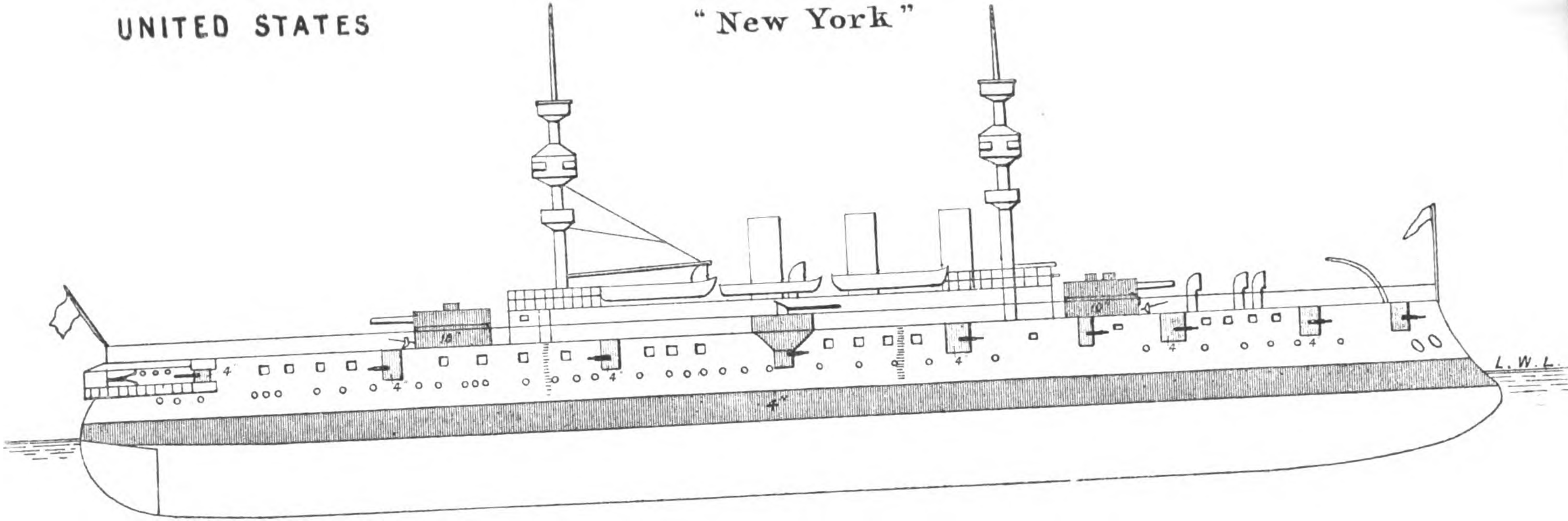


On Special Scale

UNITED STATES

ARMOURED CRUISER.

"New York"



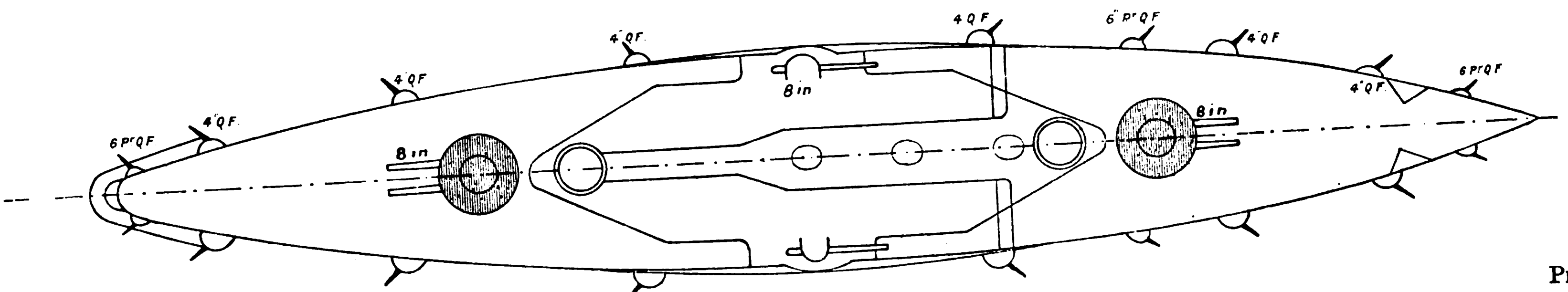


PLATE 87.

UNITED STATES

BATTLE SHIPS.

"Oregon"
"Massachusets"
"Indiana"

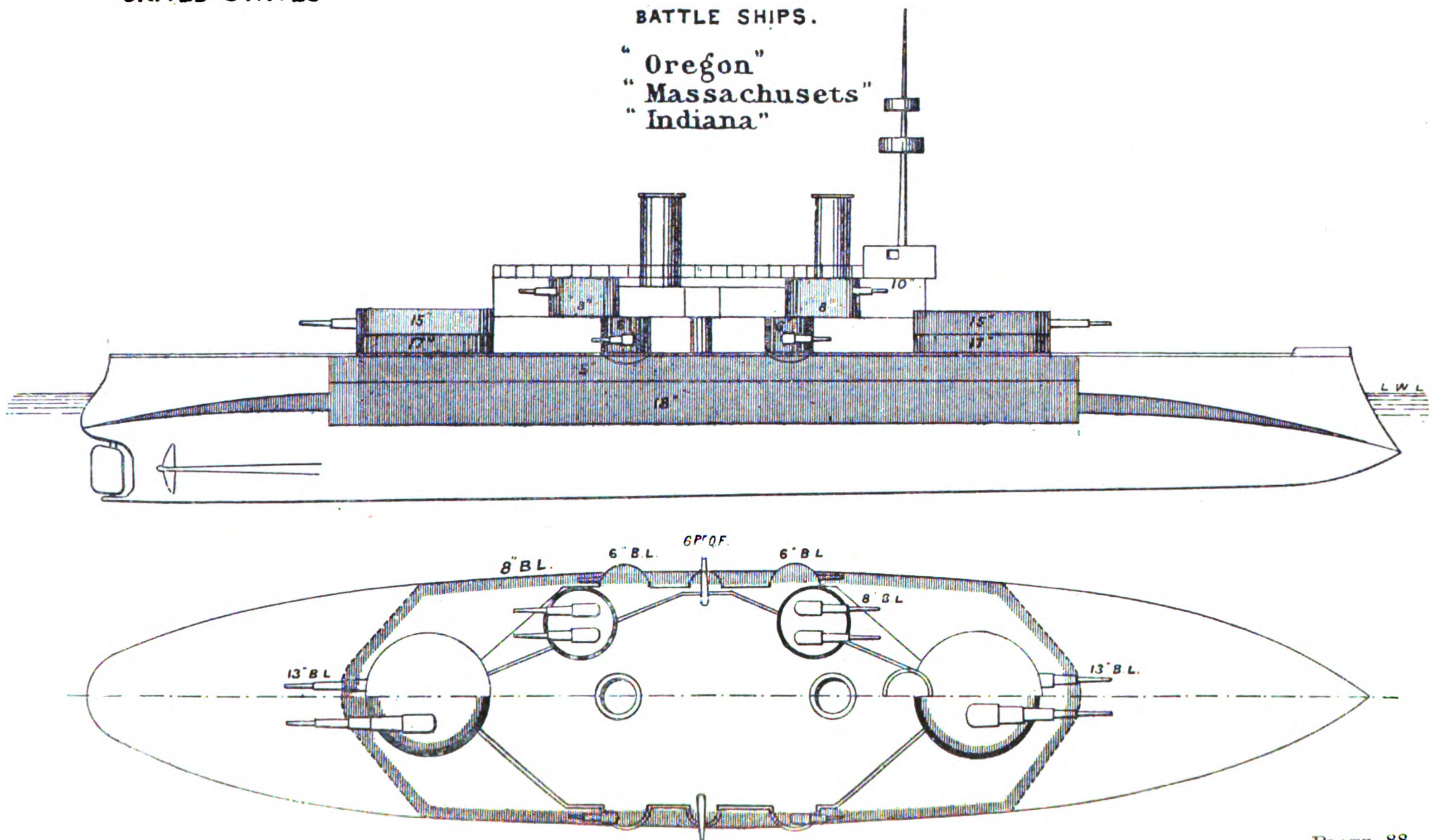


Plate 88.

Texas — UNITED STATES

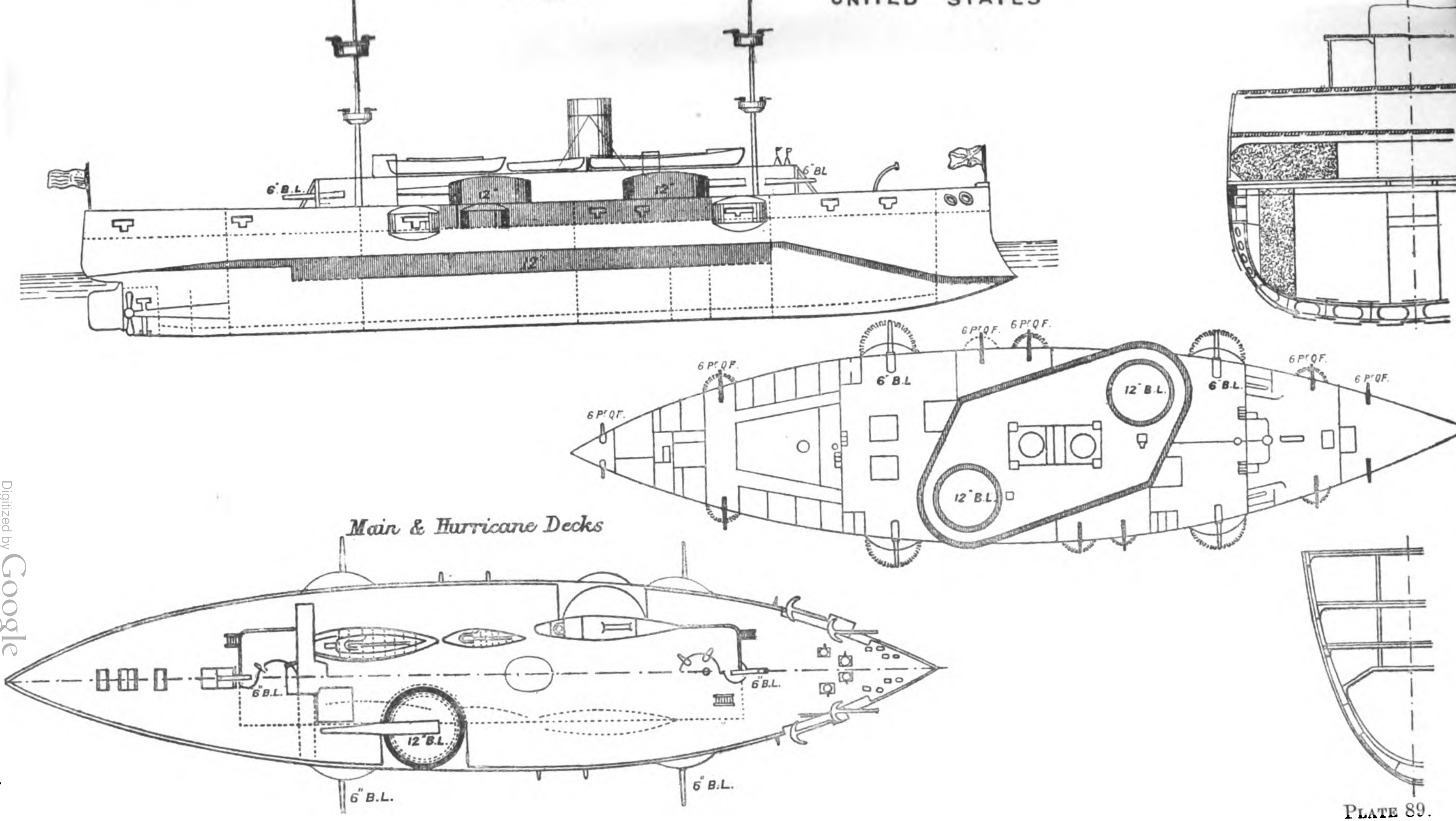


PLATE 89.

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PART III.

ARMOUR AND ORDNANCE.

PART III.

Armour and Ordnance.

CHAPTER I.

ARMOUR.

THE course of events of the past year has clearly established the wisdom of covering the upper structure of war ships with armour to a great extent, even at the cost of considerable thickness on the water-line belt. The ever-increasing power of quick-fire has for some years past demanded this. Less change in design may probably be thus brought about in British vessels than in those of most nations, because in our battleships of the Royal Sovereign and later classes the most important parts of the upper structure are armoured more heavily than in most battleships of other fleets, and also because the plating extends continuously down to the water-line. It is only necessary to compare the drawings of the Royal Sovereign, Majestic, and Canopus class with the Charlemagne, Jauréguiberry, Kaiser Friedrich III., or other ships in which a thick belt extends from bow to stern, to see what a price is paid for this complete belt, in the shape of weak places beneath the gun positions and elsewhere in the upper structure. Russia has long since given up the complete belt, which formerly was one characteristic of her designs, and has covered her upper structures amidships with plating not far short of our own in thickness. One marked peculiarity of the disposition of her armour was the extraordinary thickness and resisting power of her belts. This year, however, a great change has been made. Instead of $15\frac{3}{4}$-in. steel, the belt of her new battleship, the Retwisan, building at Cramp's Yard, is 9-in., which is supported by the armour deck being brought down to the lower edge. In short, the Majestic arrangement

Authorities.—The *Engineer* for plates and matter; *The Scientific American*, the *Times*. The United States Series of Information from abroad, the Appendix to the Report of the Chief of the Bureau of Navigation, and other information, furnished by the courtesy of Captain Colwell, U.S. Naval Attaché; the United Service Institution Proceedings, Notes on Naval Matters; Messrs. Vickers; Captain Tresidder, of Brown's; Messrs. Cammell, Herr Krupp, Mr. Hadfield, Mr. Beardmore, and Messrs. Carnegie.

is adopted. Above this is 6-in. plating, while 5-in. armour protects the battery of twelve 6-in. Q.-F. guns, which, with four 12-in. guns, make the armament of both primary and secondary guns exactly that of the Majestic class, to which, however, are added a larger number of light Q.-F. guns. Sir William White is to be congratulated on the fact that the progress of events during the last seven years has brought foreign naval constructors to copy closely the Majestic type, which he had designed about the beginning of that period. Marked as is this adoption of thin plating, it is likely to be pushed with even greater energy now that the battle of Santiago has supplied an illustration of how rapidly vessels may be destroyed by the attack of their upper structure when unprotected; for, as narrated elsewhere, the three Spanish armoured cruisers, whose protection was limited to thick water-line belts, were destroyed in a few minutes; while the Cristobal Colon, which had 6-in. Harveyed armour over the principal parts of her upper structure,* ran past the American ships and obtained without difficulty a lead which ought to have ensured her escape, although it is only possible to judge fully how far the armour protected her when her sides are fully examined.

Value of armour.

Altogether, then, the impulse given to the extended employment of thin armour plates on vessels is likely to be general, even though it be accompanied with great sacrifices elsewhere. It happens, however, that the introduction of Krupp armour has come at a time when it enables thin or medium plates to be used without entailing the loss in protection elsewhere that would have been inevitable had steel with unhardened face been still employed. The word Krupp has been used advisedly, because Harveyed armour would not only give the advantage of Krupp process plates in less degree under the most favourable conditions, but might also, it is thought, under some circumstances cause disappointment. To make this clear it is necessary to distinguish between the two ways in which a plate may be perforated, which may be termed "boring" and "punching." An armour piercer, unless prevented, drives its sharp point through a plate at the point of impact, opening the metal outwards, and so clearing a path for the shot's body to follow. This process may be called "boring" a hole. A blunt projectile cannot do this. It can only perforate by driving a disc of plate out in front of it. This is the way that a common shell with a blunt head and a nose fuze perforates, and it may be termed "punching," and is resisted by the plate's tenacity or toughness. It requires greater force than boring, because the action of tearing is more easily performed

* The Colon had a complete belt, but it was only 6-in. thick, so that armour could be provided for her upper structure.

the more it is localised, as everyone has experienced in tearing tough material with their fingers. A sharp point enters with the minimum resistance, and makes the commencement of a tear, which is not only continued with the least possible expenditure of force, but in a manner which pushes the torn plate out of the path of the shot. Consequently when a hard plate face fractures even the tip of a shot's point, it does much, and when this flattening is carried so far as to defeat the boring action completely, so that the shot can only punch, the hard face has fully answered its object. Fig. 8, p. 376, appears to furnish unusually good illustrations of the above. The bulge of No. 7 shows the boring of a point protected from fracture by a cap. No. 1 shows a bulge yielding at the apex, but in a less degree, probably because the shot's head, though flattened and broken at the point by the plate face, is not so far deformed as to entirely prevent boring, though it is very imperfectly performed. Bulges 2, 3, 4 and 5 are yielding round their circumference; in each of these cases boring is completely defeated, and a large disc is being driven or punched out.

To apply this to the case of thick armour. A hard face in itself enables a reduction to be made safely; for the defeat of the pointed shot of the most powerful guns involves the defeat of everything else. With thinner armour, however, the case is different. Suppose that a hard-faced plate 5 in. thick is substituted for 8 in. of ordinary steel, it will be at least as complete a defence against armour-piercing shot, say from the 6-in. gun striking at 30°; but there is the possibility of attack by heavier guns. The 8-in. ordinary and 5-in. hard-faced will both naturally be perforated by heavier armour-piercing shot, but this is unavoidable, and after all the projectile will come through in the form of dead metal, and that perhaps but little broken. Shell attack is more serious. The question arises—Will a heavier shell, whose punching attack is defeated by an ordinary 8-in. steel plate, be necessarily defeated by 5-in. hard-faced steel? Fracture of point does not come in here, so that the thinner plate needs increased toughness. This is possessed by Krupp process armour in a remarkable degree, but it may be questioned whether other kinds of hard-faced plates would not fail. This question is important, because an enemy may have a belt which under service conditions defies attack, and the heavy guns may then be best employed in shell attack on the upper structure, especially when the Q.-F. guns are in a single battery, and not in separate casemates or turrets.

Shell fire has now become more formidable than ever, but happily armour has been so wonderfully improved as to be able to assume

more and more functions of defence. Armoured decks were the natural complement of the vertical defence limited to vital parts, but traverses, casemates, and the like grew up gradually, so that it may be said that thin armour has returned in a more scientific form than in old days. In fact, owing to the increased volume of quick-fire on the one hand, with increased explosive and incendiary power, coupled, on the other hand, with the growing hardness and toughness of armour, our ships are becoming much more completely sheathed in plates, which are, however, much thinner; while the guns have gone back from the few heavy pieces of the Thunderer and Inflexible to an armament corresponding in numbers much more nearly to those of the old Warrior and Agincourt.

The alterations which appear to be likely, then, are as follows:— The thick narrow complete belt will disappear. That is to say, even should complete belts be retained they will not be in the shape of a thick defence applied to the bare water-line and abruptly disappearing, and leaving nearly the entire hull above it without protection.

The Spanish ships at Santiago had 12-in. belts, which may be called complete, although they tapered to a point at bow and stern. They represented considerable money and weight, yet it may be questioned if they were any use at all. The proper solution, however, is not to do away with all belts, but to employ much thinner plates. For a cruiser, which presumably will not be called upon to fight in line with men-of-war, the plates should be specially hard, so as to afford the maximum resistance to a single blow, rather than power to bear long-continued attack. The armour thus saved in the belt will no doubt be employed to protect the Q.-F. batteries and other important parts of the upper structure. The Cristobal Colon, in fact, although her belt was continuous, nearly embodied what is suggested. She had a belt 6-in. thick, from which 6-in. plating was carried upwards amidships, so as to cover the Q.-F. guns and the whole space between the principal heavy guns; and as a result the Colon is said to have suffered but little, and surrendered, not because of the injuries received, but rather to the hopelessness of engaging the Brooklyn and Oregon together, when it become clear that they had both nearly come up with her. Evidently the horrible incendiary effect caused by common shell must be prevented as far as possible. The Germans have got rid of all wood; it will be only a question of time before we do the same to a great extent. It seems curious that the instant action of explosion should fire solid wood as it does. Probably, lumps of burning powder are driven into the wood, and these, carrying their own oxygen in the composition, burn so fiercely that even water might fail to put them out. It is

easy, however, to conceive that a structure covered with thin hard plates, and with no wood, would bear the fire of common shell sufficiently well to show that belt attack might become, what it never did at Santiago, a matter of great importance. Certainly, with battleships this would be the case: in these the heavy principal guns will seldom be entirely replaced by quick-firers.

Carnegie 12-in. Krupp plate.

During the last few months successful trials have been made in both England and America with thick Krupp armour. In England Brown and Cammell are the makers, in America the Carnegie Company. Data as to these trials, with official photographs of the plates, are given hereafter. The Carnegie plate was 12-in. thick, and it was attacked by three 12-in. armour-piercing projectiles, each weighing 850-lb. The first had 1833 foot-seconds striking velocity, and is said to have penetrated 8½-in., and remained embedded without producing cracks. The second struck with 2022 foot-seconds velocity, and passed clean through into the backing, breaking up badly. The third round, striking with 1720 foot-seconds, only penetrated 5 in. This trial may be said to assure the adoption of Krupp process plates in the United States for thick as well as thin armour.

We believe that makers will concur in saying that all Krupp process armour is difficult to make, at all events at first, and that the manufacture of thick plates is beset with obstacles such as are enough to defeat any efforts, except those made with skill and great perseverance. Once success is attained, however, the process has no doubt been so carefully watched in all its phases and surroundings that it can be reproduced very much more easily and certainly, so that we may now hope that Sheffield could turn out thick Krupp process plates as a matter of supply on a large scale.

Brown 12-in. Krupp plate.

Figs. 1 and 2 are from official photographs of a Krupp process plate made by John Brown & Co., Atlas Works, and tested by Government trial on July 21 last by three blows of 12-in. Holtzer armour-piercing shot, each weighing 714 lb., striking with velocities of 1852, 1856, and 1849 foot-seconds, with the effect shown in the figures. The dimensions of the plate are 10 ft. by 7 ft. by $11\frac{11}{16}$ in., and its weight about 15 tons. The calculated perforations of wrought iron by Tresidder's formula are 23·65 in., 23·70 in., and 23·60 in.; the figure of merit, had the second blow just perforated, would be 2·03—that is, the plate would have been equal to 2·03 times its thickness in wrought iron. It was, obviously, much better than this, though it is impossible to say by exactly how much. The test as to energy or shock was great, that of the heaviest blow being 1138 ft.-tons per ton of plate, the total energy of the blow being 17,060 ft.-tons, which, divided by the weight of the plate in tons,

gives this result. One similar Vickers Krupp process plate was tested in a like manner on August 19, 1897. The perforation test is very severe for thick plates; but, however, the hard face of the

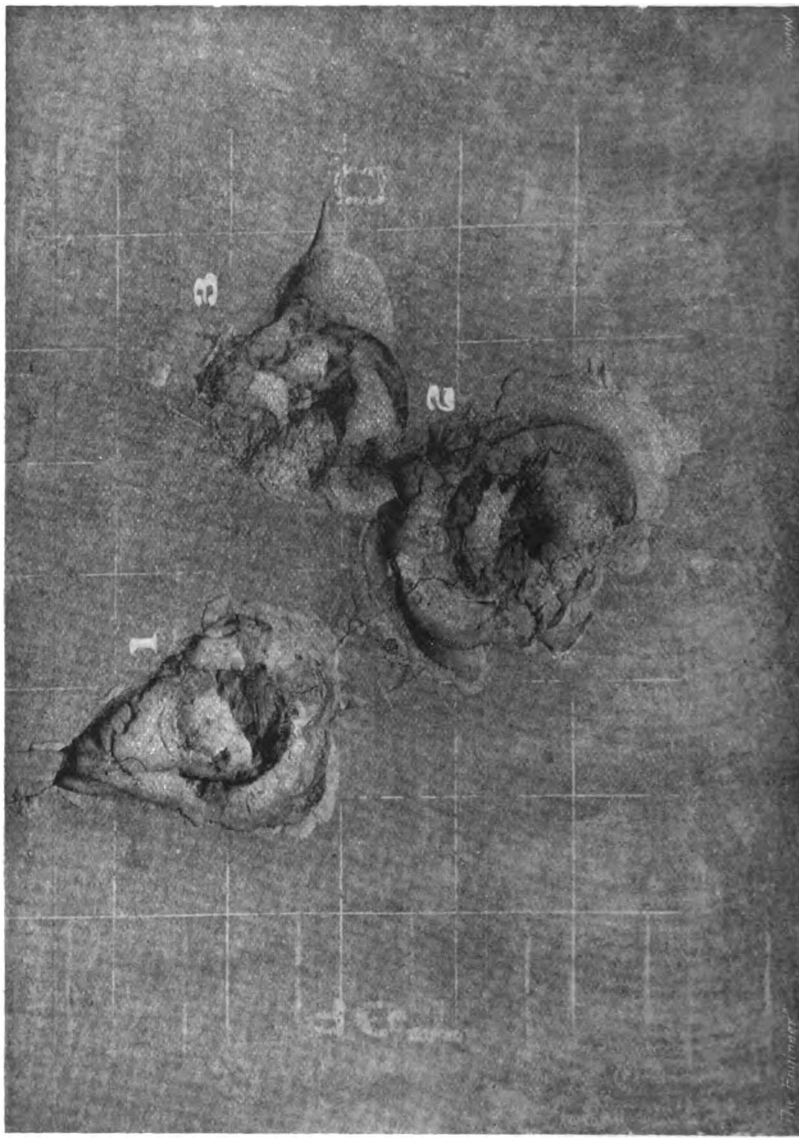


Fig. 1.—Front of Brown Krupp $11\frac{15}{16}$-in. Plate.

plate defeated the blow before the projectile got far enough in for the plate to find out what its diameter or total weight was. Doubtless it is only by this means that the plates bear the blows as they do, but it remains also true that the greater the size and bulk of the shot, the

more work is necessary to break it, and the larger the portion of head which enters with wedging power, which can probably best be measured by the diameter or calibre of the shot.

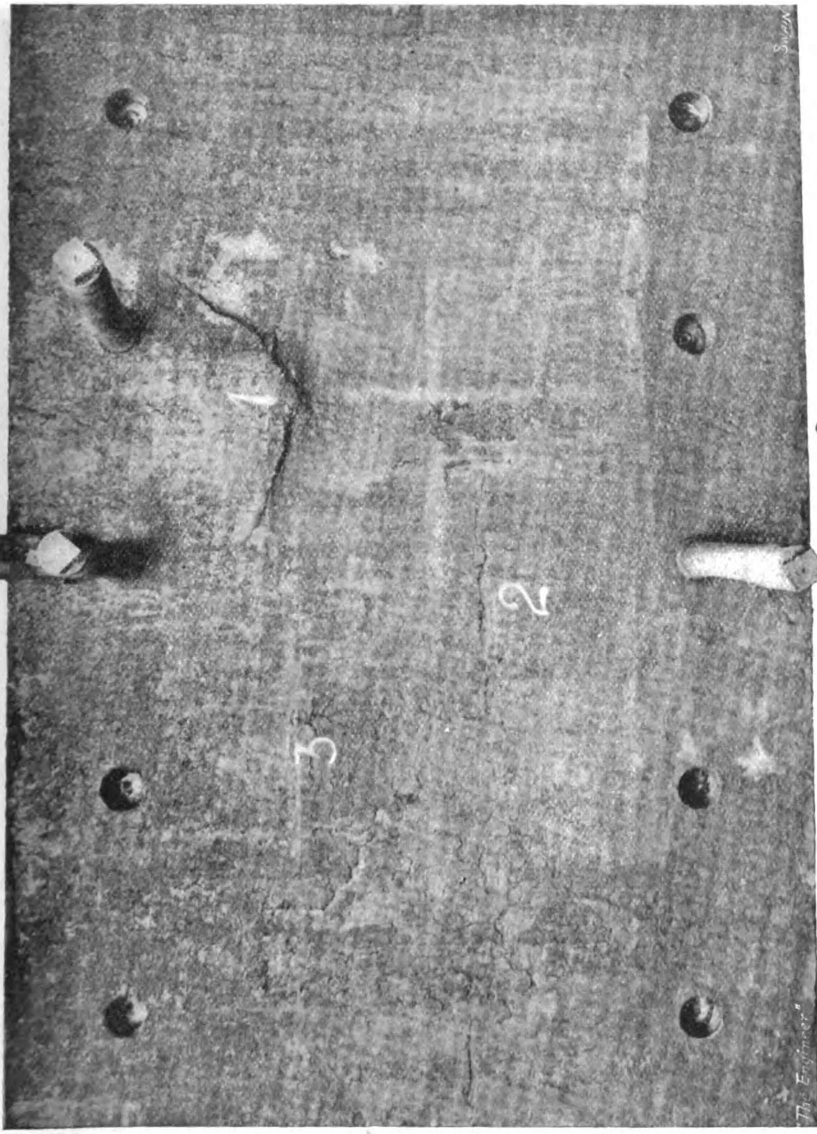


Fig. 2.—Back of Brown Krupp 12-in. Plate.

Cammell 12-in. Krupp plate.

The conditions of trial of the Cammell plate were practically identical with those of its rivals from Vickers and Brown. The plate weighed 14 tons 16 cwts. 1 qr., or if its bolt holes were filled up 14 tons 17 cwt. 2 qr. 19 lb. There is no thickness laid down

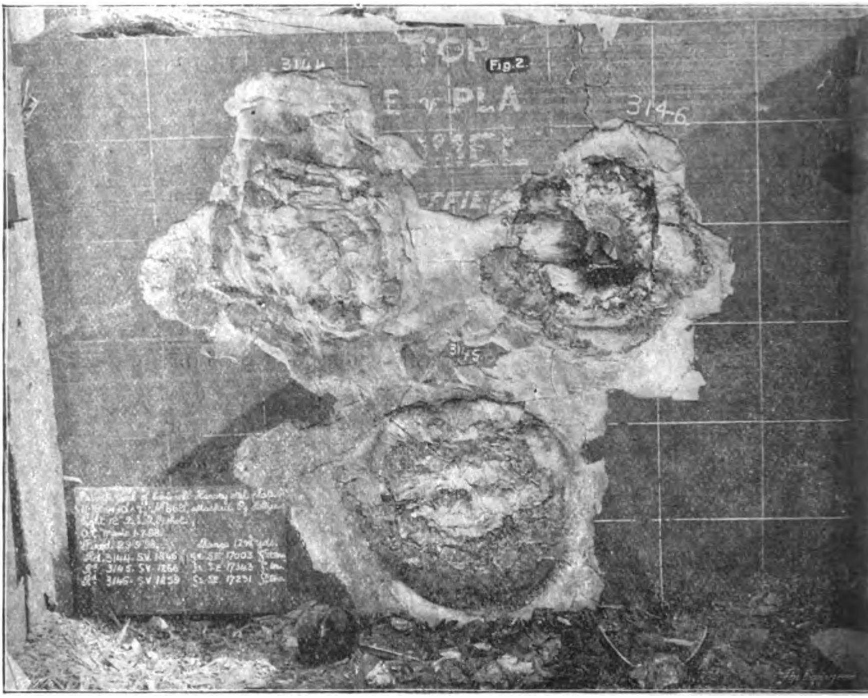


Fig. 3.—Front of Cammell Krupp Plate.

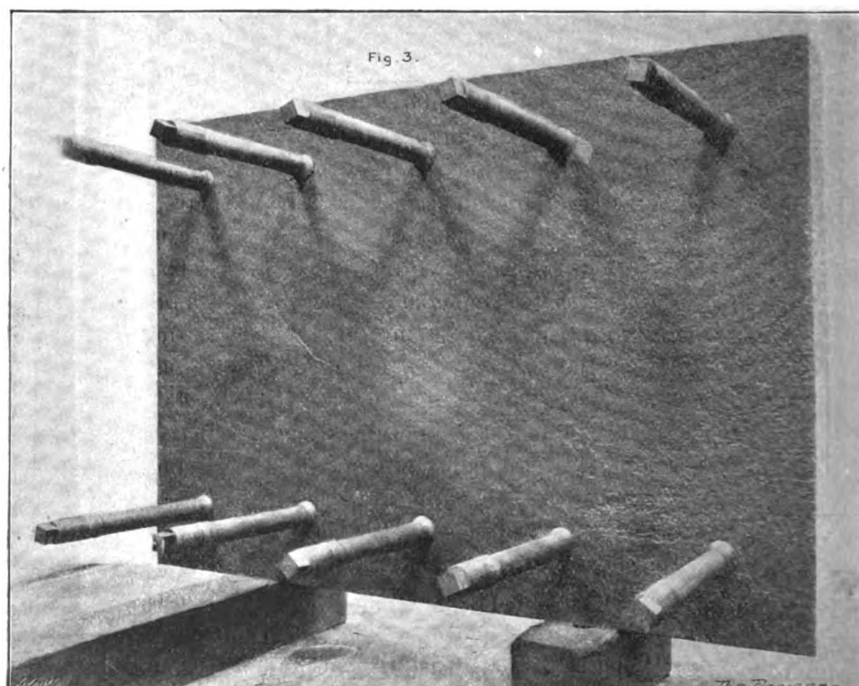


Fig. 4.—Back of Cammell Krupp Plate.

directly, but the plate must not weigh over 480 lb. per sq. ft. This forbids the thickness being as great as 12-in., seeing that Krupp process plate weighs 490 lb. per cubic ft. This plate will be found, if worked out, to be 11·66-in. thick. It was attacked by 12-in. Holtzer shot, with the velocities and weights and energies shown in the Table below.

How well the plate behaved may be seen in the photograph. Fig. 3 shows the plate after the three blows. Fig. 4 shows the back.

The following table shows the data of this trial:—

	Holtzer shot weight.	Striking velocity.	Striking energy.	Perforation, wrought iron, Tresidder.	Relation of calculated perforation in iron to actual thickness of plate.	Energy per ton of plate.	Effects.	
							Penetration.	Cracks.
	lb.	f.-s.	ft.-tons.	in.		ft.-tons.	in.	
1	719·75	1846	17,000	23·5	2.02	1145	3·85	1 crack developed after the third round from first point of impact.
2	718·50	1866	17,350	23·7	2·03	1168	not known	..
3	719·25	1859	17,240	23·5	2·02	1161	not known	1 crack to top and 1 to edge of effect of second round.

The trial of Vickers' 12-in. Krupp plate having been given in the last *Annual*, it is undesirable to dwell longer on these trials. The object is to record the important fact that the whole of our Sheffield firms have now achieved complete success in the manufacture of thick as well as thin Krupp process armour.

The photographs herewith show results of a trial of an experimental Carnegie plate made on Krupp's process. The special points of interest are, first, that Krupp's process should be adopted in the very home of the Harvey process; secondly, the severity of the test; and thirdly, the comparative action of ordinary uncapped and of capped shots.

Carnegie 6-in. Krupp plate.

The trial took place on July 13th last at Indian Head, under the United States naval authorities. The plate measured 9-ft. by 5-ft. by 6-in. It was backed by 12 in. of oak and two $\frac{5}{8}$-in. skin plates held up by ten bolts. The plate face was hardened to a depth of from 1·5-in. to 2-in. The attack was made with a 6-in. gun firing Carpenter steel projectiles, weighing about 100-lb. each. The positions of impact on

the plate are shown in Fig. 5. The data of the four rounds fired are shown in the following table :—

Number of round.	Striking velocity.	Striking energy.	Calculated perforation through iron by Tresidder's formula.	Relation of calculated perforation to thickness of plate.	Results.
	Ft.-sec.	Ft.-tons.	Inches.		
1	2021	2832	14·1	2·35	Projectile smashed with about 2·5-in. penetration.
2	2237	3470	16·3	2·72	Ditto, with 5-in. estimated penetration.
3	2350	3830	17·7	2·95	Perforated, but remained in backing and broke up.
4 (capped)	1984	2730	13·9	2·31	Perforated plate and backing and broke up.

The effects of the rounds may be seen by the photographs—Figs. 5 and 6. The first round near the centre caused a dish in the face round the point of impact about $\frac{7}{16}$-in. deep. A bulge 1·5-in. long was formed at the back, but no cracks were effected. The projectile was not broken up small, one fragment containing a large portion of it.

No. 2 projectile broke up, a great part remaining welded in the plate. A bulge 4·5-in. high was formed on the back of the plate. The front was dished about $\frac{1}{3}$-in. round the point of impact.

The third round was the hardest blow delivered in the trial—see Figs. 5 and 6—and perforated the plate and broke up, carrying all its fragments into the backing.

The projectile punched out a disc in front of it. The plate was not cracked, nor were bolts or structure injured. The fourth round was fired with a Carpenter projectile capped, thus weighing 104 lb. It struck low down to the right of the centre line—see Fig. 5. It perforated the plate, backing, and skin, and broke up, barely entering the sand butt in rear. There was no dish in front, and but little flaking. The plate was not cracked, and bolts and structures were not injured.

The plate was naturally held to have shown remarkable powers of resistance.

The features in this trial, which appear to be of special interest compared with our own trials, are:—First, the plate was tested up to complete perforation. Round three, in which the shot stopped in the backing, is probably nearly the exact measure of the plate's powers of resistance, seeing that the plate kept out the previous round with only 113 foot-seconds less velocity. Probably, however, a shot with even considerable increase of velocity might effect little more penetration behind the armour, seeing that the shot

broke up and perforated by punching, for it may readily be admitted that a great amount of energy would be necessary to drive fragments and disc through the skin.

That perforation should eventually be only achieved by punching

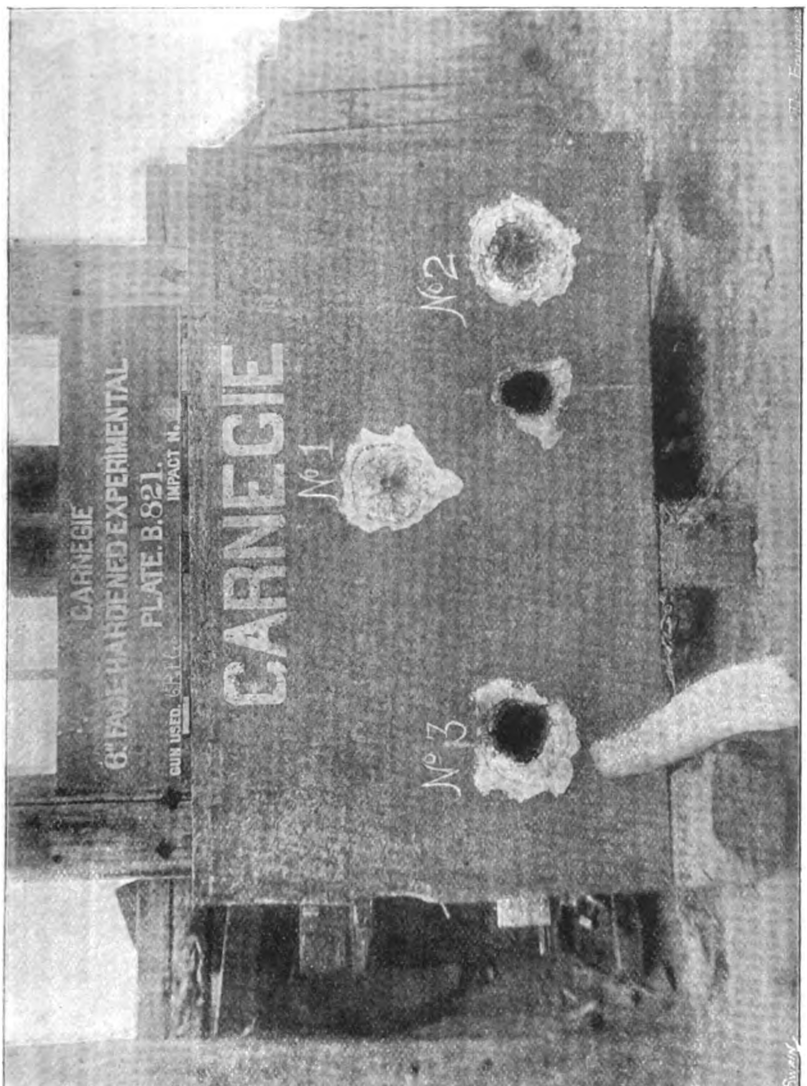


FIG. 5.—FRONT OF CARNEGIE KRUPP PLATE.

is extremely interesting, showing the behaviour of the face in defeating the entrance of the sharp point. The dishing of the face round the point of impact in this and the previous rounds seems to show how much toughness was called into action. The factor of this round

is enormous, namely 2·95. This was a little beyond the actual factor of the plate's power of resistance, but that of the previous round, namely 2·72, is very great, larger than hitherto met with. Probably, our own excellent Sheffield Krupp plates would give as

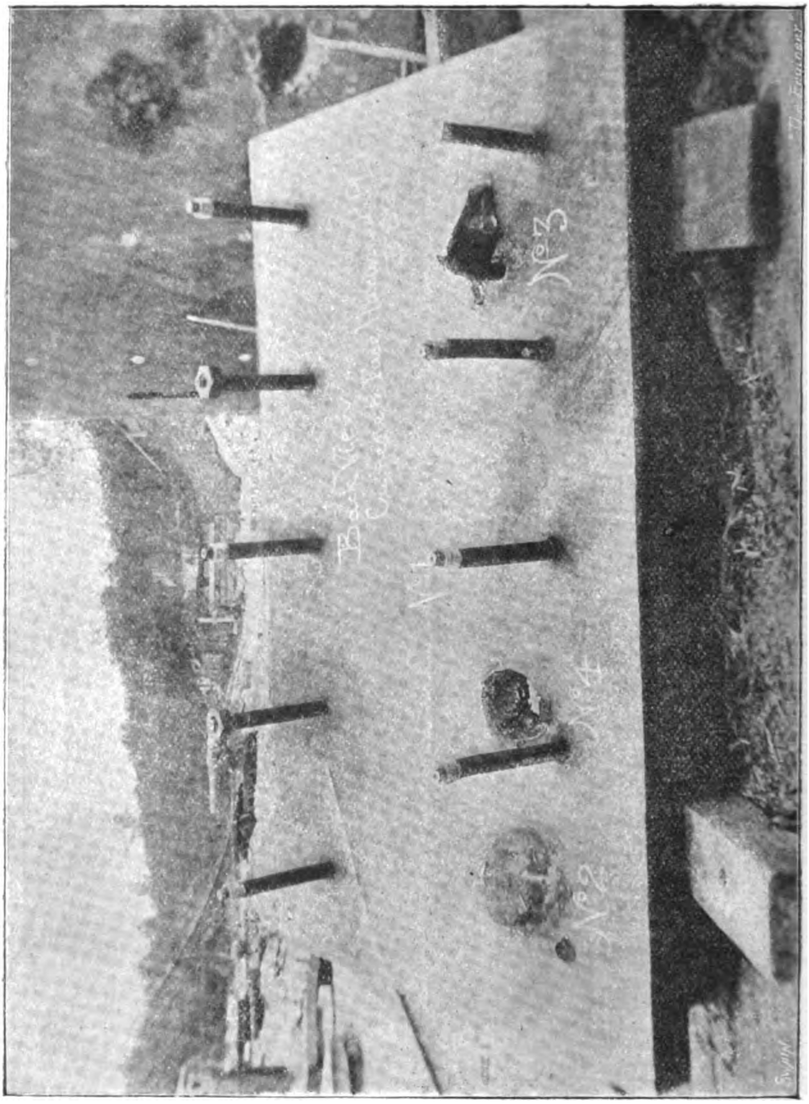


FIG. 6.—BACK OF CARNEGIE KRUPP PLATE.

good a factor, but they have not been so severely tested, and we see the value of the test being pushed thus far in exhibiting the manner in which the plate yields. Then, the behaviour of the capped shot is of the highest interest. The cap apparently enabled the shot so far

to retain its point as to perform its boring action through the plate, and by this means to get through plate and skin, although breaking up, thus defeating the plate with a velocity of 1984 foot-seconds, and a figure of merit or factor of only 2·31.

Before leaving the subject of thick Krupp plates may be given a result supplied by Krupp himself, which may be taken as his record result with 11·8-in. plates attacked by a 12-in. gun, although obtained so long ago as June 5, 1896. The data of this trial are given in the following table:—

No. of round.	Weight of shot.	Striking velocity.	Height of bulge at back.	Perforation of wrought iron by Tresidder.	Relation of iron perforation to thickness of plate.	Penetration measured.
	lb.	ft.-sec.	in.			in.
1	718	1917	2·16	24·5	2·08	6·69
2	714	1979	2·16	25·6	2·26	doubtful
3	712	1687	1·37	20·3	1·86*	,,
4	715	2066	2·95	27·5	2·33	,,

* This round was delivered on a part of the plate only 10·9-in. thick.

The figure 2·33 attained by the last round is very large for a plate of this thickness to defeat. What margin of resistance remained might be guessed if a photograph of the back were supplied. This, however, cannot be done.

Beardmore's armour tested.

Figs. 7 and 8 show photographs of some 5·9-in. plates supplied by Messrs. Beardmore, of the Parkhead Forge and Steel works, Glasgow, to the Danish Government. The trial was one to govern the supply of 600 tons of armour for casemates for the Herluf Trolle, a warship building at Copenhagen. The special interest attaching to it lies in the fact that the plates are made by a process devised and perfected by Messrs. Beardmore, and therefore of British origin. The test is a severe one, as shown by the following figures:—

No. of round.	Weight of shot.	Striking velocity.	Striking energy.	Calculated perforation through iron.	Relation of calculated perforation to actual plate.	—
	lb.	f.s.	f.-tons.	in.		
1	112·4	1854	2679	13·2	2·20	Penetration about 4½-in. —two cracks.
2	112·4	1831	2613	12·9	2·15	Penetration about 3½-in. —one hair crack.
3	112·4	1827	2601	12·8	2·13	Penetration about 4-in.
4	112·4	1834	2621	12·9	2·15	No sensible penetration —one hair crack
5	112·4	1841	2640	13·0	2·17	Penetration about 5⅛-in.
6	112·4	1836	2627	13·0	2·17	Penetration about 4-in.
7	112·4	1839	2636	13·0	2·17	Penetration about 6-in. —one crack.

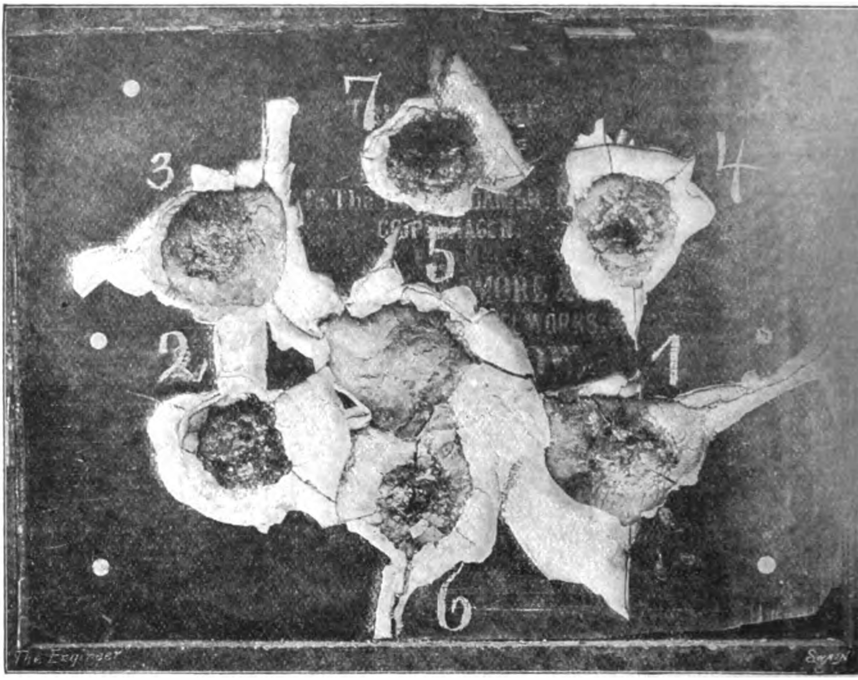


Fig. 7.—Front of Beardmore Process Armour Plate.

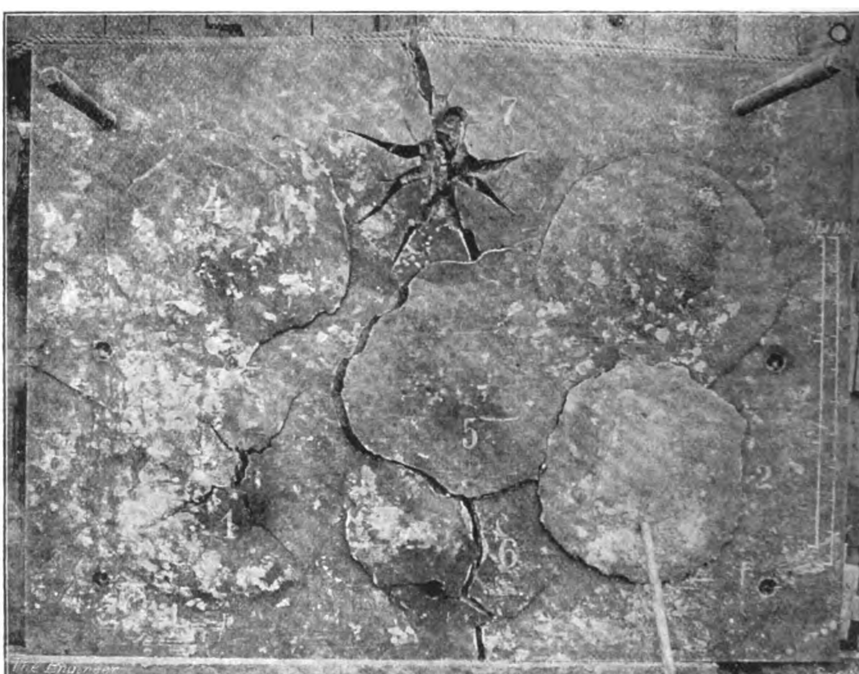
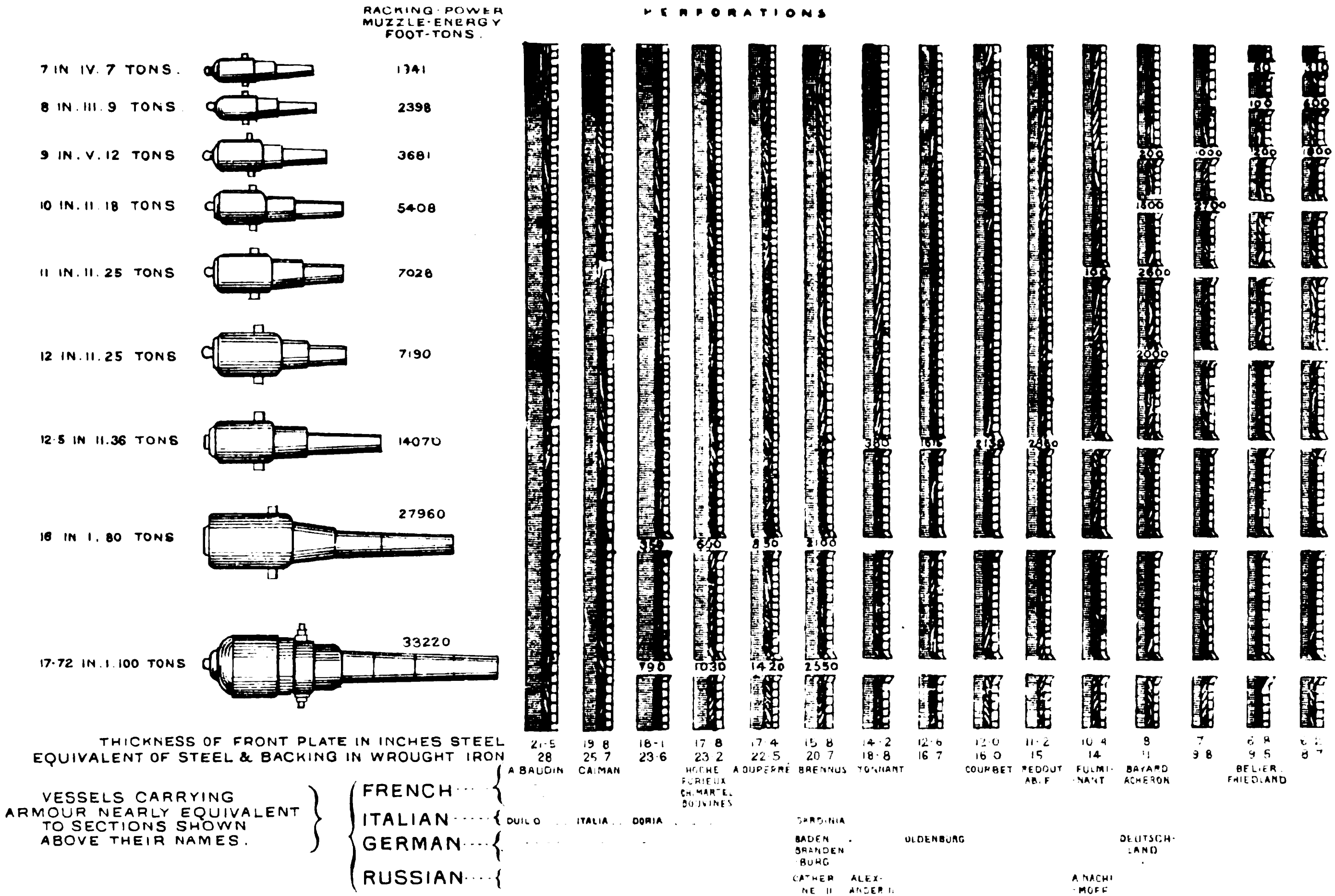


Fig. 8.—Back of Beardmore Plate.

PL. I.



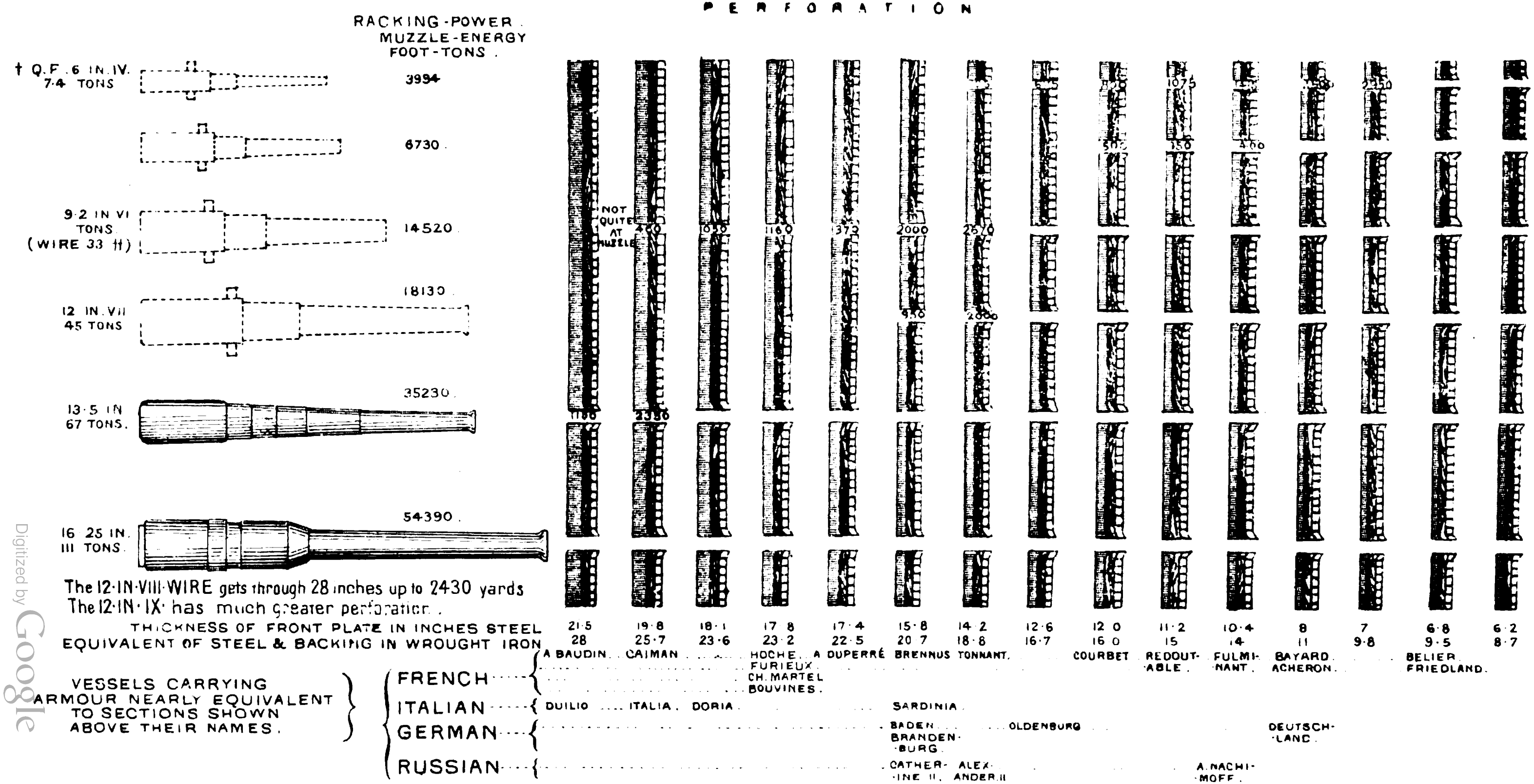
A HOLE WITHOUT FIGURES MEANS PERFORATION UP TO 3000 YARDS. MAXIMUM RANGES OF PERFORATION, LESS THAN 3000 YARDS, ARE MARKED IN FIGURES.

SCALE - 20 FEET TO AN INCH. SHADED GUNS ARE CORRECT IN GENERAL OUTLINE.

ALL BACKING IS 18 IN. OF WOOD WITH 1½ IN. SKIN.

BRITISH B.L. GUNS.

PERFORATION



A HOLE WITHOUT FIGURES MEANS PERFORATION UP TO 3000 YARDS. MAXIMUM RANGES OF PERFORATION, LESS THAN 3000 YARDS, ARE MARKED IN FIGURES.

SCALE - 20 FEET TO AN INCH. *SHADED GUNS ARE CORRECT IN GENERAL OUTLINE.*

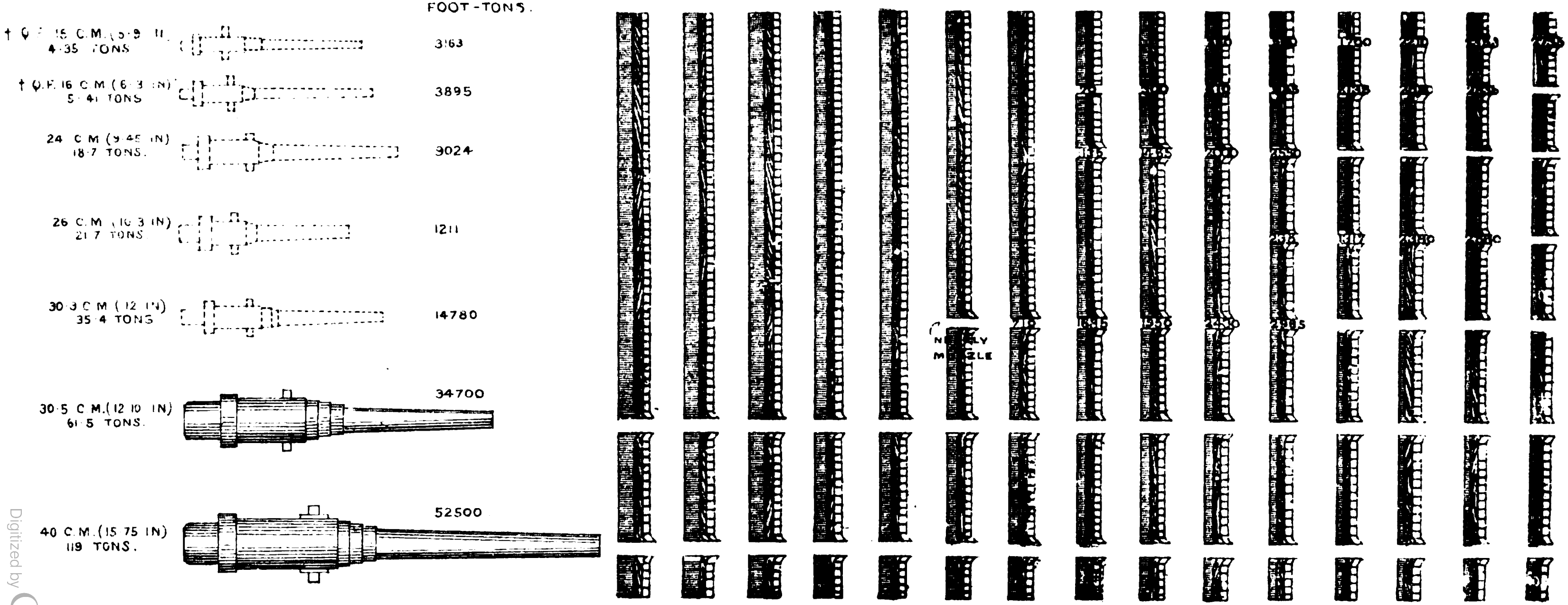
ALL BACKING IS 18 IN. OF WOOD WITH 1+ IN SKIN.

NOTE THE 29 TON 10 IN. GUN PERFORATES THE 18·8 IRON (TONNANT) SHIELD AT 1800 YARDS AND ALL THINNER SHIELDS AT ALL RANGES.

† THIS GUN IS TAKEN FROM ELSWICK Q.F. GUN TABLE. *†† PERFORATIONS CALCULATED BY TRESIDDERS FORMULA.*

*** VICKERS 6 IN. Q.F. GUN WHEN FIRED AT PORTSMOUTH HAD A MUZZLE ENERGY OF 5373 FT TONS IMPLYING A PERFORATION OF 22·7 INCHES OF IRON.*

PERFORATION



THICKNESS OF FRONT PLATE IN INCHES STEEL	21·5	19·8	18·1	17·8	17·4	15·8	14·2	12·6	12·0	11·2	10·4	8	7	6·8	6·2
EQUIVALENT OF STEEL & BACKING IN WROUGHT IRON	28	25·7	23·6	23·2	22·5	20·7	18·8	16·7	16·0	15	14	11	9·8	9·5	8·7
VESSELS CARRYING ARMOUR NEARLY EQUIVALENT TO SECTIONS SHOWN ABOVE THEIR NAMES. FRENCH	A. BAUDIN	CAIMAN		HOCHE. FURIEUX. CH. MARTEL. BOUVINES.	A. DUPERRÉ	BRENNUS.	TONNANT.		COURBET.	REDOUT-ABLE.	FULMI-NANT.	BAYARD. ACHERON.		BELIER. FRIEDLAND.	
ITALIAN	DUILIO.	ITALIA	DORIA			SARDINIA.									
GERMAN						BADEN BRANDEN-BURG.		OLDENBURG				DEUTSCH-LAND.			
RUSSIAN						CATHER-INE. II.	ALEX-ANDER. II				A. NACHI-MOFF.				

A HOLE WITHOUT FIGURES MEANS PERFORATION UP TO 3000 YARDS. MAXIMUM RANGES OF PERFORATION, LESS THAN 3000 YARDS, ARE MARKED IN FIGURES.

SCALE - 20 FEET TO AN INCH. *SHADED GUNS ARE CORRECT IN GENERAL OUTLINE.*

ALL BACKING IS 18 IN. OF WOOD WITH 1½ IN SKIN.

† TAKEN FROM KRUPP Q.F. GUN TABLE.

‡ TAKEN FROM KRUPP ORDNANCE AT CHICAGO.

It was stipulated that no through cracks, such as would detach any portion of plate, should be made. The length of the plate thus selected for trial was 6-ft. 6-in. Five shots were to be fired, but at the conclusion of these the Danish officers tried the effect of two additional rounds; presumably because the plate had borne the first five rounds very well, and the last shot fired was capped with wrought iron. The plate was finally considered to have borne the entire attack very well.

This test, apart from the two extra rounds, approaches the British test, but does not quite equal it, the average relation of theoretical perforation to actual thickness of plate being 2·16, as compared with 2·24 at Portsmouth. The Krupp projectiles, however, are certain to be superior to the old-fashioned Holtzer shot used by us, so that the conditions of attack are not sufficiently similar to enable a fair comparison to be made. It may be noticed that the attack of the seventh round—that is, capped shot—was well borne. The point of the first round appears to have been less deformed than the remaining five uncapped shot, for it may be seen that the bulge of the first round at the back of the plate is yielding at the apex, while the others are giving way in concentric cracks round the bases of the bulges.* Apparently this plate behaved more like Harveyed than Krupp process armour, for the latter has such toughness that it is difficult, indeed hardly possible apparently, to crack a 6-in. Krupp plate, whether completely perforated or not. If Messrs. Beardmore's plate does not manifest this unique toughness, they must be congratulated on having themselves devised and developed a process which has produced plates of a very high quality, so high that it would need careful investigation to pronounce how it compares with plates which have been the result of many years' work and special patented processes. Messrs. Beardmore use chromium, and the plates are not subjected to any prolonged carburisation process.

* This behaviour is discussed on page 365.

CHAPTER II.

ORDNANCE.

IN last year's *Annual* the principal features noticed in the progress of ordnance were the increased development of quick-fire and the introduction of guns possessing very high muzzle velocity. As there was no decrease in weight of shot this increased velocity implied actual increase in energy. In short, the new guns were more powerful than their predecessors. This year the battle of Santiago has furnished an illustration of the part played by guns in actual war. The hurried character of the action must be borne in mind, not only in making any estimate as to the relative values of gun-fire and attack by torpedo or by ramming—a comparison which is not within the scope of this chapter—but also in considering the actual effects to be expected from artillery fire. Certain conclusions, indeed, were so obvious that they have already affected the shape in which ordnance is being developed. Thus it is clear that if a ship can be set on fire, riddled with mitraille, and driven to surrender in a few minutes by the attack of her upper structure, the protection of her so-called vital parts has availed her nothing. This indicates the great value of rapid shell-fire attack against ships which afford an opening for it; but as it is obvious that the upper structure of ships will in future be protected in some measure with armour, it follows that before long quick-fire guns must be employed capable of penetrating such armour. On the upper structure of the Colon, as well as many of our own vessels, 6-in. Harveyed armour has been employed. This thickness is as yet very rarely found in foreign ships, but it must probably be looked for in future designs. Consequently we ought to embody in our armaments a Q.-F. gun capable of perforating such armour at fighting ranges and at probable angles of impact. Krupp process armour is now adopted in Germany, England, the United States, and Russia, and is likely to come in generally. Krupp 6-in. plate at 30° impact probably represents between 16 and 17 in. of iron. Our newest and best type of 6-in Q.-F. gun can hardly

Authorities.—The *Engineer* for plates and matter. The *Times*. The report of the chief of the Bureau of U.S. Ordnance. Captain Honner, R.N., of Elswick. Messrs. Vickers, especially communications received from Lieut. Dawson, R.N.; and the ordinary sources of official information, especially the Addendum to the Official Treatise on Ordnance.

perforate this at a range exceeding 600 yards, so that while we are well armed with Q.-F. pieces for present requirements, it is necessary to look for a more powerful broadside Q.-F. gun for the future. A 7·5-in. gun is spoken of, because an 8-in. projectile of 250 lbs. weight is too heavy for rapid work. Even a lighter one, weighing 210 lbs., is inconvenient. It is possible that a satisfactory 7·5-in. gun may be brought out; the point, however, to keep clearly in view is the work to be achieved. A gun that is not sufficiently powerful to perforate the structure that it is called on to attack is a failure, however conveniently it may be worked. Undoubtedly for many purposes it may be more valuable than the heavier piece, but the perforation of 6-in. Krupp plate appears to be a primary need in the future, and ought to be provided for, even at the cost of great diminution of speed of fire, or the introduction of mechanical appliances for loading.

High velocities and new powders.

With regard to high velocity, difficulty continues to be experienced in maintaining the flattering results promised, and at first realised, by new type guns with smokeless powder charges. A new powder may appear to promise great things, that is, it may deliver its projectile at the muzzle with a very high velocity, and with a very reasonable pressure on the gun. Gradually, however, the fact is apparent that the bore is rapidly wearing, and the velocity drops in a most disappointing way. Thus it happens that one smokeless powder after another obtains a high reputation in its early experimental stages of trial, but is regarded with less complacency by its owners after a longer acquaintance has shown how it treats the guns in which it is fired. This is probably more or less true of cordite, and the new Russian and American powders, and we all have at present to make the best of it. It is possible that some better powder may be found, but it is well not to accept statements as to its merits until they are established by a longer trial than would have been thought necessary hitherto.

Shell-fire.

From what has been already said it is obvious that the importance of shell-fire has this year become even more apparent than before. The Resistance and Belliqueuse trials had shown that shells produce terrible effects on ships' structure. In the former case the ship was repeatedly set on fire. Nevertheless an actual illustration on service of the destruction of ships by this means, in spite of all efforts to get the fire under, has told greatly on public opinion. Germany had already decided to use no more wood in ships of war. It cannot be doubted that other Powers will now follow her example. It is to be observed, however, that desirable as it is to abolish all wood, the main object is answered by having none unprotected by armour.

seeing that it is extremely difficult to carry fire through plates of even medium thickness. As ships become better protected and less liable to be set on fire, stronger shells with greater penetrative power and less explosive force—in fact, armour-piercing shells—will be more generally employed, but at present common shells are the projectiles that would be chiefly employed in war. This year the problem of safely carrying and firing shells charged with high explosives has been so completely mastered in the Royal Laboratory that projectiles charged with high explosives are now issued for service.

United States report of chief of Bureau of Ordnance, 1898.

It is stated by the chief of the Bureau of U.S. Ordnance that the supply of war-stores for service in the late war with Spain was satisfactory and adequate. The following samples of work done are selected from the report :—

New loading arrangements, designed by Lieut. Haeseler, were installed in the Texas for 12-in. guns, under the condition that the ship should during the process be capable of going to sea within forty-eight hours. The work was so well done that the time of loading was reduced from eight to two minutes. Automatic gear was fitted to the 8-in. turret guns of the Iowa and Brooklyn. Electric gear for working turrets and loading has proved superior to any other power. All new guns of 4-in. calibre and above are now fitted with telescope sights ; 6-in. Q.-F. guns are now adopted, which are to fire ammunition not having a metal case. The new gun is 45 calibres long, weighs eight tons, and is designed to give a muzzle velocity of 3000 f.s. The cruiser New Orleans (formerly the Amazonas), purchased from Elswick, has given satisfaction as to her battery and general arrangements. The Vesuvius fired her automatic guns off Santiago de Cuba, "but the value of this vessel must be considered" * doubtful. Heavy guns in turrets are shown to be necessary, but the "greatest execution," except against the heaviest armour, is done by Q.-F. batteries. The largest calibre recommended for the future is 12 in., which calibre effects a great saving, as compared with the 13-in. gun, in weight of turrets, &c. It is also thought that 12 in. is the maximum thickness desirable for armour of the improved quality now made. Smokeless powder has been adopted, and a factory begun for its manufacture.

Capt. Honner on adoption of guns.

Capt. Honner, R.N., now of Elswick, in a letter on the question of gun construction, lays stress on the following points. He says that a gun, like a battleship, must be a compromise arrived at when keeping the following considerations in view : (1) the defence which the gun

* Lieut. José Müller y Tejeiro, of the Spanish Navy, reports the effects of the bursting of the shells to be terrible, but the shooting "not to be very sure," which appears to be his way of expressing that the shells never fell even "close to a battery."

is called upon to attack; (2) the velocity necessary to obtain a low trajectory at fighting ranges; (3) the wear of the bore and consequent length of life of the gun. Up to the present time the strength of the defence to be attacked has been uncertain and changing, owing to the continual development of armour, but to this there now appears to be a definite limit, at all events at present, namely, 6 in. This appears to be probable, because the 6-in. plate has been well proved experimentally, and is the thickness best suited to bring out the powers of a hardened face. Such a plate will resist the impact of a 6-in. projectile with a striking velocity of 1960 f.s., and hence the 6-in. calibre of gun offers itself as the basis on which to form conclusions as to the attack of 6-in. armour. The 6-in. gun also is a convenient piece for an auxiliary armament, and is capable of perforating average 6-in. hard-faced steel plates with a velocity of 2000 f.s., although some plates have now been made capable of resisting such attack. This, then, is a useful limit.

Again, in order to attack armour, especially on a moving target, it is necessary that the point or points of attack should be clearly discernible by the men laying the guns. The maximum range at which such objects (*i.e.*, the conning-tower, casemates, gun-shields, and points of vital importance) as would form the main points of attack can be seen with sufficient clearness is about 1500 yards, and we may therefore consider that for effective armour attack this is the outside range. With these premises borne in mind the problem becomes comparatively easy, and we have to find what the initial velocity would be to give a striking velocity of 2000 f.s. at 1500 yards range. This is 2550 f.s., which we may take as the practical velocity from a penetrative point of view. Advocates of higher velocity will urge in its favour that penetration is thus ensured at 1500 yards, and may be obtained at longer ranges. Against this the wear of the gun must be considered. Armour-piercing projectiles for the above gunnery considerations are not profitably used beyond 1500 yards range, and should be replaced by common shell.

Next, as to the velocity necessary to obtain a low or flat trajectory at fighting ranges. This is a matter of calculation of "dangerous space," *i.e.*, the admissible error in estimating range in order that an object 10 feet high may be hit. 3000 yards is probably the greatest range at which ships will engage, even with common shell, and for this, with 2500 f.s. muzzle velocity, the 6-in. gun trajectory is sufficiently low. 2800 f.s. offers only a gain of 17 yards in the dangerous zone, and this is altogether incommensurate with the sacrifice necessary.

The wear of bore, and life of the gun is, with modern powders, a

serious problem. The wear increases enormously as the velocity becomes very high, and consequently the shooting becomes inaccurate very quickly, the case finding a parallel in the large increase of steam-power needed to give small increments of speed after a certain limit is reached. In a 6-in. 45 calibre gun 18 lbs. of cordite gives a velocity of about 2500 f.s., while 25 lbs. is needed to give 2800 f.s., that is to say, an increase of about 39 per cent. in the charge adds only 12 per cent. to the velocity. In the former case there would probably be no serious loss in accuracy and velocity in 400 rounds; in the latter, 300 f.s. would be lost in the first 100 rounds, and 150 in the second 100. Specially devised gas-checks may restore lost velocity for a few rounds, but no gas-check yet invented has prevented wear of bore, which is more due to the heat of the powder-gas than to its rush past the projectile. It may be concluded then that the practical artillerist will prefer a gun giving a good working velocity, with accuracy which can be fairly maintained for a reasonable time.

The above expression of opinion is given with little abridgment, and nearly in the words of the writer, because Captain Honner's opinions will carry special weight, and it is due to Elswick to bear in mind that Q.-F. guns emanated from that establishment, that Elswick advocated what were considered high velocities at a time when others were slow to adopt them, and any caution from Elswick as to the evils accompanying the employment of the much higher velocities now obtaining should carry great weight. It should be understood also that the exceptional 6-in. plates, which defeat 6-in. shot, as at present fired, at higher velocities than 2000 yards, will soon become the rule. It is, however, probable that shot will be fired with caps on their points which may enable them to preserve this relation, or something like it, so that we may take 6 inches of the best armour as about a match for the best 6-in. shot fired directly. In action, however, a shot will generally strike at a considerable angle of impact, and hence we need a more powerful gun than the 6-in. to cope with 6-in. armour. 8-in. Q.-F. guns have long since been recommended by Elswick, and have formed part of the equipment of Elswick cruisers for some years past.

Arrogant's attack of coast-shield.

On August 18th a shield and dummy gun, mounted on Rudder Rock Battery, Steep Holm Island, in the Bristol Channel, was subjected to attack by the guns of H.M. cruiser Arrogant. The trial was witnessed by officials from the Admiralty and War Office. Soon after 9 a.m. the Arrogant, steaming at ten knots, attacked the shield with her starboard guns at about 1800 yards range. These consist of three 4·7-in. quick-firers, four 12-pr. quick-firers, supported by 6-in.

Q.-F. guns on the centre line fore and aft, and one broadside gun, placed forward to sweep from abeam to the fore and aft line. The shot struck the cliff near the battery, but missed the shield itself. The attack was repeated several times, till nearly 200 projectiles had been fired; a portion of the shield had then been knocked off and the surrounding structure reduced to a mass of rubbish. Few shot flew wide, and as, towards the end of the trial, a heavy sea was running, the firing seems to have been fairly good. So far as the above goes, it only supports what has been repeatedly laid down, namely, that firing at coast-guns mounted behind shields is a difficult task from a ship in motion. It is sure to involve a great expenditure of ammunition, and this a ship cannot well spare. A heavily-armoured line-of-battle ship at anchor might probably have done much better, and possibly she would not have laid herself open to more injury, for she might have lain obliquely—perhaps nearly head on—when a few rounds from her most accurately firing guns might have done as much as many when running at ten knots. It may be observed that a system has come in of employing vertical fire from coast-forts to prevent ships from anchoring, this form of attack being very formidable to ships at anchor. Experiments of this kind are needed at the present time, when the value of coal has been shown to be so great that it might be deemed worth while to capture a coaling station even at considerable sacrifice.

Practice at French Arrogante target.

On September 20th last M. Lockroy witnessed target practice from the French battleships Brennus, Charles Martel, Magenta, and Jauréguiberry, and the cruisers Chanzy and Galilée. The target was the old floating battery Arrogante, 131 feet long and 16 feet high. She carried her original armour in place. After about 350 rounds she was seen to heel over and founder in deep water.

New wire guns.

Although some wire guns have been for many years past in the British service, there has been nothing approaching the heavy long pieces recently brought in. The 12-in. gun, Mark VIII. was designed for sea service, but on the longer piece known as Mark IX. turning out well, the latter has been also brought into the Navy. The 12-in. guns of ordinary construction, known as Marks I. to VII., were 328·5 in. long, and delivered their projectiles, which weigh 850 lb., at the muzzle with 1915 foot-seconds velocity, or 18,139 foot-tons energy. The wire 12-in. gun, Mark VIII., is 445·5 in. long, and delivers its 850-lb. projectile with 2367 foot-seconds velocity, and about 33,020 foot-tons energy. There is a new 12-in. gun, Mark IX., which will, it is hoped, have something like 2600 foot-seconds velocity, and 39,850 foot-tons energy, but it is premature to give definite figures. It will be seen, then, that the increase in power in

the 12-in. wire gun is very great. It is no doubt true that some foreign guns, which are not of wire construction, claim equally high velocities, but where this is achieved by a gun of equal weight it is done at much greater risk to an ordinary piece than to a wire gun. Moreover, it may be noticed in foreign tables that the high velocities shown are at times only calculated, and fail to be realised, at all events as service velocities; so that, after a while, a lower velocity is often substituted for that at first put forward.

Apart from the adoption of the wire system, changes have been made in the breech action, which is now worked by a single motion. It is desirable to make this clear, because our heavy pieces are probably served with the same speed and ease as some foreign guns which are designated quick-firing pieces. Statements of British armaments are further likely to be misunderstood, owing to the fact that, having dispensed with the metal cartridge in our new 6-in. gun, it is proposed not to call this a quick-firing piece, in order to make it clear that it does not take the usual quick-fire metal cartridge. From the point of view of a store ledger this may be convenient, but it can hardly fail to cause general misunderstanding, and it seems desirable that some designation should be adopted which points to the gun being a very new and efficient quick-fire weapon, and not an obsolete one.

12-in. gun, Mark VIII.

To return to the 12-in. gun, Mark VIII. Fig. 1 is from the official photograph showing the construction of the piece. The principal features to notice are the application of the wire, the length of the bore, and the form of chamber. The piece is, as may be seen, trunnionless. The principal dimensions and data are as follows:—Length, 445·6 in.; calibre, 12 in.; length of bore, 425·15 in.,

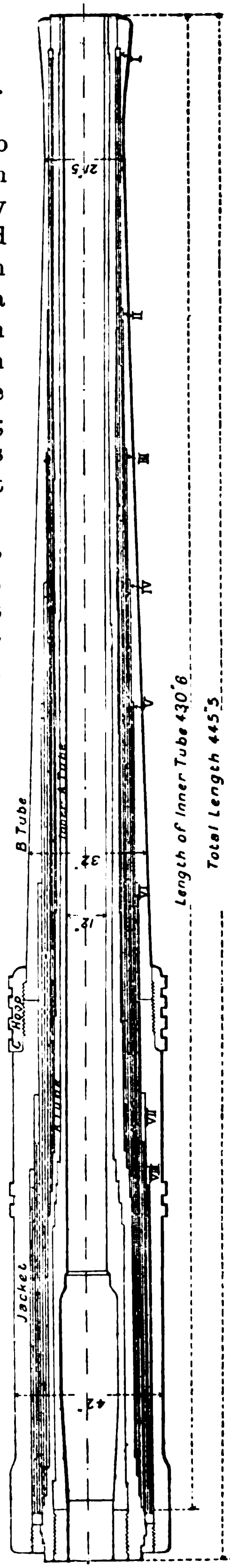


FIG. 1.—12-IN. MARK VIII. WIRE-WOUND GUN.

or 35·429 calibres; chamber diameter, maximum 16 in., minimum 12·8 in. The rifling is the so-called polygrove, modified plain section, with a twist increasing from 0 to 1 in 30 calibres at the muzzle. The weight is 46 tons, that of previous patterns being 45 or 47 tons. The gun has a steel "A tube" extending from seat of obturator to muzzle. The inner A tube is secured longitudinally to the A tube proper by means of corresponding shoulders, and a steel breech bush is screwed into the A tube at the rear end, the breech bush being prepared tor the reception of a breech screw. Around the A tube are wound successive layers of flat steel wire, extending from the rear end of the chamber to within a few inches of the muzzle, the ends of the wire being secured to steel rings provided for the purpose. A steel ring forming a stop for the wire is shrunk on to the A tube at the breech end. Over the wire come jacket and B tube, being secured by shoulders, &c. The C hoop is screwed over the jacket, and is prevented from turning when in position by means of a steel pin, which is passed through the C hoop into the jacket, and secured by a screwed rivet. "Thrust rings" are formed on the exterior of the C hoop and jacket, to secure the gun to its mounting. Guns are designated "right" or "left," according to the place they are intended to occupy, and are fitted with the mechanism required to work them from each side, when mounted as a pair in turret or barbette. The breech screw has a thread with six interruptions, and is therefore locked by one-twelfth of a turn.

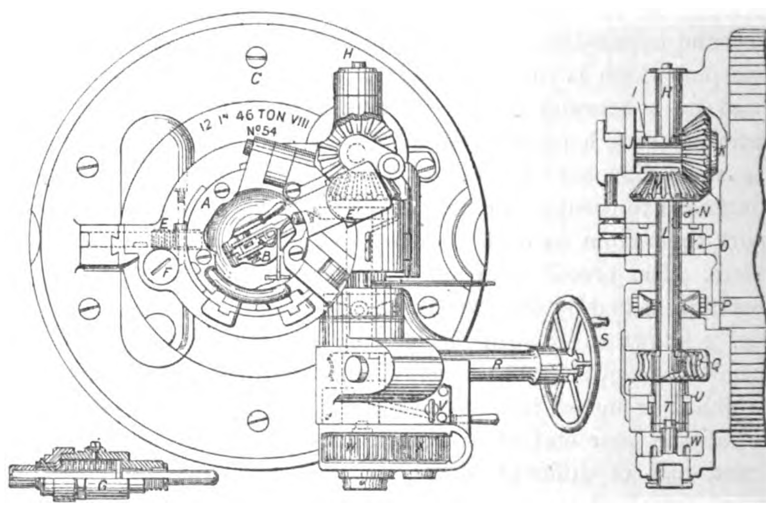
Breech mechanism.

Fig. 2 shows the breech mechanism from the rear and in vertical section. The right side of the screw is recessed to receive a steel rack by which it is pushed into or withdrawn from the gun. The last two teeth at the rear end of this rack are made much stronger than the rest, and of different shape, to give the increased strength required for the last part of the movement in inserting the breech screw. The rear end of the rack itself, and a portion of the screw over the rack recess, are cut away to give the necessary clearance for the working of a flange on the rack pinion. Attached to the rear face of the breech screw by fixing screws is a bronze end plate—A in Fig. 2—on the bottom of which is formed a handle for withdrawing purposes, and on the top a recess, usually filled by a preserving block, for the attachment of a cam lever for use when the usual working fails. On the right side of the end plate, fitting in an undercut, and held by a fixing screw, is a steel plate E, the inner face of which is cut away, so as to form an eccentric groove termed the roller path, on the side of which the friction roller of a crank acts in turning the breech screw. On the same side of the end plate, but lower down, is a steel roller F, with axis pin and set screw, which, in

conjunction with a flange on the rack pinion, serves to start the obturator and screw from its seating. The axial vent and obturator are of ordinary form. The vent, fitted with spring washer and nut, and prepared for the reception of a shell box, has, owing to the recessing of the breech screw, a much shorter spindle than usual.

A circular plate of bronze, C, termed the "frame breech mechanism," is attached to the face of the breech by six fixing screws. On the left side it is cut away to conform to the shape of the breech, and it has a projection recessed to receive the outer end of the "clip retaining," during the pushing in or withdrawal of the breech screw.

Fig 2
12-INCH B L MARK VIII MECHANISM.



G is the piston of the buffer; D, ring carrier of bronze, with projections formed to give the required bearing for the breech screw when withdrawn; E, small steel friction roller; F, screwed recess for attachment of G, buffer; H, upper portion of hinge bolt; I, gun-metal bush; J, friction roller; K, bevel wheel; L, lower portion of hinge bolt; M, wheel bevel; N, steel contact bolt; O, steel rack pinion; P, metal roller frame; Q, bronze worm wheel; R, frame bearings; S, handle; T, clutch; U, forked lever clutch; V, guide bolt; W, clutch pinion; X, automatic pinion.

To open breech it is only necessary to turn the worm spindle by hand wheel S, which, by its bevel wheel gearing, first turns the breech screw round into the withdrawing position, and then forces it

back until firmly held by the carrier, and finally swings the breech screw and carrier together round to their loading position, that is, clear of the bore, the gear being devised to carry this through by one continued movement of the hand wheel.

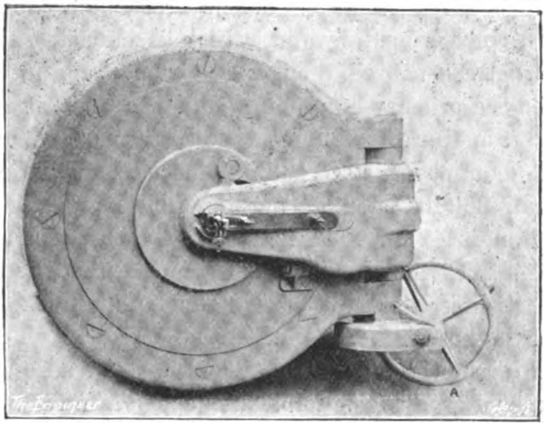


FIG. 3.—VICKERS' BREECH MECHANISM.—CLOSED.

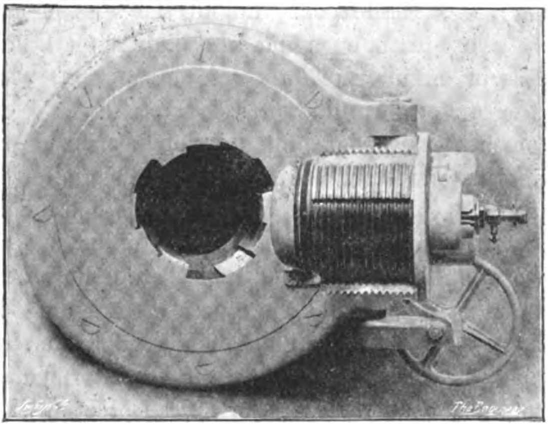


FIG. 4.—VICKERS' BREECH MECHANISM.—OPEN.

To close the breech, reverse the hand wheel, thus: first swinging round the carrier with the breech screw on it, the latter being brought truly opposite to the bore; then the rack and pinions coming into action, carry the screw home into the breech, and the crank turns

the screw round till it is locked, this being accomplished by one continuous turning motion of the hand wheel.

In some ships provision is made for automatic working by recoil, but a hydraulic arrangement has been substituted in later mountings. In the event of the ordinary gear being put out of order the mechanism can be adapted for working by hand.

Figs. 3 and 4 are photographs of the breech mechanism for the Vickers 12-in. breech-loading gun, which is embodied in the new Mark IX. gun of this calibre. This piece is of special interest, seeing that it will be the primary gun mounted in the barbettes of our new battleships. It is 40 calibres long; its exact muzzle velocity cannot be yet stated. Supposing it to be 2600 foot-seconds, its energy with a shot weighing 850 lbs. is 39,858 foot-tons, and its muzzle perforation of wrought iron is 42 in. The breech is shown closed and open in Figs. 3 and 4. The mechanism is so arranged that, by turning the hand-wheel, the breech-plug is first rotated and unlocked, and then swung out of the breech of the gun.

The unlocking of the breech-plug is effected by means of what is commonly known as a toggle-joint, the longer arm or link of which has one end fitted on a pin on the face of the breech-plug, and the other end is fitted by a pivot-joint to the shorter arm or crank mounted in a recess in the carrier on a pivot parallel with the axis of the gun, both the link and the crank thus working in a plane parallel to the face of the breech. Round the boss of the crank are formed "skew-gear" teeth, engaging into similar teeth formed partly round the boss of an intermediate quadrant pinion, which is also mounted in the carrier, but on a vertical pivot.

This intermediate quadrant pinion has also formed partly round the boss ordinary spur teeth, which engage with similar teeth on an actuating quadrant pinion fixed on the hinge-bolt of the carrier. The hinge-bolt, together with the actuating pinion, are revolved by means of a worm and a worm-wheel, which are in turn actuated by a hand-wheel suitably mounted at the breech of the gun. To open the breech the hand-wheel A, Fig. 3, is rotated, and thus by means of the worm-wheel the actuating pinion causes the intermediate quadrant and crank to turn, thus rotating the breech-plug until it becomes unlocked. By continual turning of the hand-wheel the carriers with the breech-plug are swung out clear of the breech of the gun, as shown in Fig. 4. The ordinary retaining catch is employed for holding the plug in position when out of the gun. The opposite action takes place on closing the breech. The gun is arranged for firing by electric or percussion tubes, and its action is similar to that of the 6-in. quick-firing gun.

A cam in the crank acting upon the firing-gear slide during the first turning of the hand-wheel, when unlocking the breech, makes the gun absolutely safe before the breech-plug commences to unscrew, and, by the continued movement of the crank-cam, the empty tube or primer is automatically ejected. The breech-plug is of special construction, and is threaded in segmental portions in steps of varying radii, as described a year ago, embodying the Weling patent. By this arrangement the plug, which is divided into twelve segments, has three-fourths of its circumference threaded and useful for meeting the strains on the breech, while the ordinary breech-plug has only

Fig. 5.

ORDNANCE, B.L. 9·2 INCH, WIRE, MARK VIII (N) 25·TON.

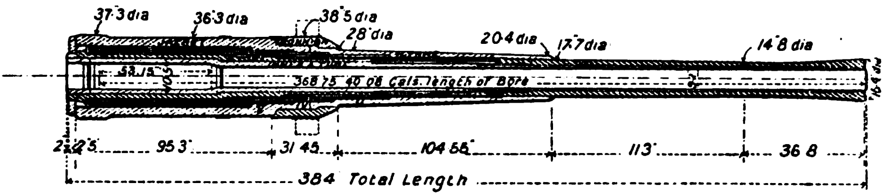
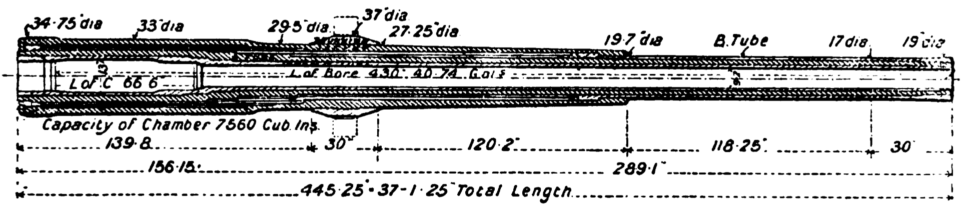


Fig. 6.

ORDNANCE, B.L. 9·2 INCH, WIRE, MARK IX (L) 27·TON.



half of its circumference threaded and similarly useful. This enables the breech-plug to be very short. Owing to the shortness of the breech-plug, it can be swung clear of the breech after unlocking without any curvature, and without the usual longitudinal withdrawal of the plug, even though the De Bange obturator is used.

This form of breech mechanism embodies several marked improvements over existing designs—(1) considerable reduction in number of parts; (2) the mechanism is quickly and easily taken to pieces, the accessibility of the parts being a great feature.

Figs. 5 and 6 show the 9·2-in. breech-loading wire-guns, "Marks VIII. and IX." These pieces correspond to the gun before described

—that is to say, they are wire-guns of greatly increased power. Their weight, however, is greater than that of their predecessor, Mark VIII., weighing 25 tons, and Mark IX., 27 tons, whereas the heaviest previous pattern, Mark III., weighed only 24 tons. Mark VIII. has a muzzle velocity of 2347 foot-seconds, and 14,520 foot-tons energy. Mark IX. is intended to have 2700 foot-seconds velocity, and 19,220 foot-tons energy, the weight of projectile for each being 380 lbs.

NOTES ON TABLES OF ORDNANCE.

THE authorities on which the data in the Ordnance Tables are based are as follows:—

Speaking generally, the British and United States Tables contain figures from official sources. Through the courtesy of the Chief of the Bureau of Naval Ordnance the United States Table has been examined and found correct by the Intelligence Department. The Tables for the Continental powers are mainly taken from the *Austrian Marine Almanack.* The energies and perforations, however, are worked out independently, as explained below. The Q.-F. Ordnance Tables of Elswick, Vickers, Schneider Canet, and Krupp guns are obtained directly from the manufacturers, and the data in them are given on their authority. In justice to British manufacturers, the compiler would call special attention to the fact that the very high velocities, 2740 ft.-secs. and over, which occur often in the foreign tables, are very rarely found in the guns marked with an asterisk, that is, existing guns. Elswick explains the possibility of obtaining such velocities in a footnote, but limits the columns to existing guns except one 12-in. gun under manufacture.

The chief alterations this year are in the British and Austrian Tables. The Russian Table is the best obtainable, but is certainly not up to date, and readers are cautioned not to be misled by it. Much more powerful guns than those shown must now exist.

Tresidder's formula being now recognised and used in official papers, and this even for velocities below 2000 ft.-secs., it has been concluded that it is best to follow the course indicated in the *Annual* for 1896, p. 363, that is to say, to employ Fairbairn's or Maitland's formula only for velocities up to 1580 ft.-secs. For these low velocities they have been thoroughly tested and found good, and for these it would be a mistake to alter the existing tables based on them. About 1580 ft.-secs. the formulæ of De Marre, Krupp, Tresidder, Maitland and Fairbairn all agree fairly well. At this point, then, it is convenient to "shunt," as it were, from the Fairbairn, on to the Tresidder curve, for British Tables. Krupp's formula gives nearly the same results as Tresidder's, and it makes little difference which of the two is employed, and in some foreign Tables where Krupp's formula has been used it is left undisturbed, Tresidder's being often added to enable a comparison to be made. In Krupp's formula weight tells more in comparison to velocity than in Tresidder's. The actual formula used is nearly always stated on the face of the Table.

BRITISH RIFLED ORDNANCE.

(Compiled from the official "List of Service Ordnance, 1898," and supplemented by subsequent information.)

B.L. GUNS.

Ordnance.										Charge (full).	Charge (cordite).		Projectile.						Ballistics (with full charges).				
Nature.					Chamber.		Rifling. Twist one turn in														Perforation of wrought iron.		
Calibre or Pr.	Weight.	Mark and Service.*	Total length in inches.	Length of Bore, including Chamber.	Diameter (at largest).	Length to base of projectile.	Least at breech.	Greatest at muzzle.	System.†	Weight.‡	Weight.	Size.	Diameter.	Weight.§	Bursting Charge of Common Shell.	Value of $\frac{d^2}{w}$.	Value of $\frac{w}{d^3}$.	Muzzle velocity.	Total muzzle energy.	Muzzle energy per ton of gun.	At muzzle.	At 1000 yards range.	At 2000 yards range.
				calbs.	ins.	ins.	cals.	cals.		lbs.	lbs. oz.		ins.	lbs.	lbs.			f. s.	ft. tons.	ft. tons.	ins.	ins.	ins.
16·25-in.	110½ tons.	I. II. & III.	524·0	30·0	21·125	84·5	Various in the newer patterns.	30	P. Elswick, Hook, or Modified Pl. Section, the last in the new guns.	960 S.B.C.	..	..	16·25	1800	‡‡193 / **179¼	0·147	0·420	2087	54,390	492	38·0	34 6	31·7
13·5-in.	69 & 67 tons.	I. II. III. & IV.	433·0	30·0	18·0	66·5		30		630 S.B.C.	..	..	13·5	1250	**85	0·146	0·508	2016	35,230	511 / 526	33·0	30·2	27·6
12-in.	45 & 46 tons.	III. IV. V. & $V._w$	328·5	25·25	16·0	48·0		35		295 P.Br.	88 8	30	12·0	714	$31\frac{13}{16}$ / ‡‡95 / **79	0·202	0·413	1914	18,130	403 / 394	24·4	21·5	18·9
12-in.	46 tons.	VIII. Wire	445·5	35·43	16·0	70·0		30		..	167 8	50	12·0	850	80–13¼ / 32–14	0·169	0·492	2367	33,020	718	36·8	32·7	29·4
12-in.	50 tons.	IX. Wire	496·5	40·0	17·5	87·2		..		..								2600?					
10-in.	29 tons.	II. III. III.A & IV.	342·4	32·0	14·0	54·0		30		252 P.Br.	76 0	30	10·0	500	37¾	0·200	0·500	2040	14,430	498	24·8	21·8	19·[illegible]
9·2-in.	21 & 22 tons.	I. & II.	255·8	25·56	11·0	44·0		35		140 P Br.	42 0	30	9·2	380	18	0·223	0·488	1781	8,356	411 / 392	18·3	15·9	14·[illegible]
9·2-in.	24 & 22 tons.	III. V. VI. VI.A&C & VII.	310·0	31·5	12·0	43·0		30		164 P.Br.	53 8	30	9·2	380	‡‡33 / **$30\frac{6}{16}$	0·223	0·488	2065	10,910	455 / 496	22·9	19·8	17·[illegible]
9·2-in.	25 tons.	Wire VIII.	384·0	40 08	10·5	53·15		..		..	63 0	40	9·2	380	..	0·223	0·488	2347	14,520	581	27·6	23·9	20·7
9·2-in.	27 tons.	Wire IX.	445·25	46·74	13·0	71·215		..		..	..	..	9·2	380	..	0·223	0·488	2600	17,810	660	32·4	28·1	24·2
8-in.	14 tons.	III.	222·5	25·1	10·5	34·5		35		104 P.Br.	28 12	20	8·0	210	$13\frac{10}{16}$	0·305	0·410	1953	5,554	427 / 397	16·8	13·8	9·[illegible]
8-in.	15 tons.	IV.	254·5	29·61	10·5	38		35		118 P.Br.	32 10	20	8·0	210	‡‡29 / ‡‡18½	0·305	0·410	2150	6,730	449	19·3	16·0	13·[illegible]
8-in.	14 tons.	VI.						30										2200	7,046	503	20·0	16·6	13·7
6-in.	82 cwt.	(80 pr.) I.	162·6	25·53	7·5	28·05		40		34 S.P.	..	..	6·0	80	..	0·450	0·370	1880	1,961	484	11·2	8·4	6·[illegible]
6-in.	5 tons.	III.	170·7	25·53	8·0	26·75		35		36 E.X.E. / 48 E.X.E.	14 12	20	6·0	100	$7\frac{4}{16}$ / **$9\frac{13}{16}$	0·360	0·463	1960	2,665	533	13·4	10·7	8·[illegible]
6 in.	5 tons.	IV. VI.	173·5	26·0	8·0	26·75		35 / 30		48 E.X.E.			6·0										
5-in.	38 cwt. / 40 cwt.	II. / III. IV. & V.	139·15	25·07 / 25·0	5·75	19·05		25		15·5 S.P.	4 7¼	7·5	5·0	50	$7\frac{13}{16}$ / $3\frac{5}{16}$	0·500	0·400	1750	1,062	559 / 531	8·8	6·6	5·[illegible]
4-in.	23 cwt. / 26 cwt.	II. II. III. III.A IV. V. & VI.	120·0	27·0	5·8	18·5	120	30		12 S.P.	3 1	5	4·0	25	$1\frac{13}{16}$ / $3\frac{1}{16}$	0·640	0·891	1900	625	544 / 481	7·7	5·4	4·[illegible]
12-pr. (3·0)	6 cwt.	Wire I. (L.)	66·75	19·66	3·2	8·35	105	28		..	0 12 $\frac{7}{8}$	5	3·0	12·5	..	0·720	0·463	1553	209	697	..	..	..

M.L. GUNS.	72-in.	100 tons.	I. L.	391·85	20·48	19·7	59·72	150	50	P.Pl.	450 Pr.¹ Bl. or Pr.²	..	..	17·72	2000	0	106	0·157	0·859	1548	33,220	382	25·2	23·5	21·7
	16-in.	80 tons.	I.	321·0	18·0	18·0	59·6	0	50	P.Pl.	450 Pr.¹ Br	..	..	16·0	1700	0	$75\frac{4}{16}$ / c$112\frac{8}{16}$	0·151	0·415	1540	27,960	350	24·3	22 5	20·9
	12·5-in.	38 tons.	I.	230·0	15·84	Unchambered		0	35	W.	130 Pr.² or 165 Pr.¹ Bl	..	..	12·5	818·0		$37\frac{8}{16}$	0·191	0·419	1442	11,820	311	17·4	16·0	14·7
	12·5-in.	38 tons.	II.	222·8	15·84	14·0	41·125	438	35	W.	200 E.X E 210 Pr.² or 190 Pr.¹ Bl									1575	14,070	371	19·5	17·8	16·3
	12-in.	35 tons.	I.	195·0	13·54	Unchambered		0	35	W.	110 Pb.²	·3	..	12·0	714·0		$34\frac{12}{16}$	0·202	0·413	1340	8,890	273	15·5	14·4	13·2
	12-in.	25 tons.	II.	182·5	12·09	„		100	50	W.	85 Pb.²	..	..	12·0	614·0		$28\frac{2}{16}$ / c$61\frac{10}{16}$	0·235	0·355	1292	7,109	288	13·4	12·1	11·0
	11-in.	25 tons.	II.	180·0	13·18	„		0	35	W.	85 Pb.	..	..	11·0	548·0		27	0·221	0·411	1360	7,028	281	14·2	12 9	11·7
	10-in.	18 tons.	II.	180·0	14·55	„		100	40	W.	70 Pb.	..	..	10·0	410·0		$23\frac{3}{4}$	0·244	0·410	1379	5,408	300	13·1	11·7	10·5
	9-in.	12 tons.	V.	156·0	13·89	„		0	45	W.	50 Pb.	13 4	$7\frac{1}{2}$	9·0	256·0		17	0·316	0·351	1440	3,681	307	11·4	9 8	8·5
	8-in.	9 tons.	III.	144·0	14·75	„		0	40	W.	35 Pb.	..	..	7·92	179·0		→ $17\frac{12}{16}$	0·358	0·350	1391	2,398	266	9·7	8·2	7·1
	7-in.	90 cwt.	I.	131·0	15·86	„		35	35	W.	22 Pb.	..	..	6·92	114·6		→ $11\frac{1}{16}$	0·428	0·334	1325	1,395	310	7·9	6·5	5·7
	7-in.	$6\frac{1}{2}$&7 tons.	III. & IV.	133·0	15·86	„		35	35	W.	30 Pb.	..	..	6·92						1525	1,848	284	9·2	7 2	5·9
	64-pr.	64 cwt.	III.	118·0	15·47	„		40	40	Pl.	10 R.L.G.⁴	..	..	6·28	64·5		→ $8\frac{8}{16}$	0·588	0·271	1390	865	270	..	..	..
	64-pr.	71 cwt.	I.	122·72	16·42	„		40	40	Pl.	$8\frac{1}{4}$ R.L.G.⁴	..	..	6·29	64·5		→ $8\frac{8}{16}$	0·588	0·271	1260	715	201	..	..	..
	40-pr.	35 cwt.	II. L.	120·0	22·0	„		35	35	W.	$6\frac{3}{4}$ R.L.G.⁴	..	..	4·75	38·8		→ $3\frac{6}{16}$	0·582	0·362	1425	546	312	..	..	..
	25-pr.	18 cwt.	I. L.	98·0	22·0	„		35	35	W.	$4\frac{1}{2}$ R.L.G.⁴	..	..	3·94	24·96		→ $1\frac{13}{16}$	0·622	0·408	1350	315	350	..	..	..
	16-pr.	12 cwt.	I. L.	78·0	19·0	„		30	30	F.M.	$3\frac{3}{16}$ R.L.G.⁴	..	..	3·54	16·1		→ $1\frac{2}{16}$	0·771	0·366	1355	205	342	..	..	..
	13-pr.	8 cwt.	I. L.	92·0	28·0	3·15	14·13	100	30	P.	$3\frac{1}{4}$ R.L.G.⁴	..	..	3·0	13·0		$\frac{11}{16}$	0·689	0·484	1595	232	580	..	..	..
	9-pr.	8 cwt.	I. & II.	72·0	21·17	Unchambered		30	30	F.M.	$1\frac{3}{4}$ R.L.G²	..	..	3·0	9·1		→ $8\frac{12}{16}$	0·996	0·335	1330	119	298	..	..	..
	9-pr.	6 cwt.	I.	61·0	17·67	„		30	30	F.M.	$1\frac{1}{2}$ R.L.G.²	..	..	3·0						1250	97	323	..	..	..
	9-pr.	6 cwt.	II. III. IV.	74·5 / 74·875	22·0	„		30	30	F.M.	$1\frac{3}{4}$ R.L.G.² / $1\frac{1}{2}$ R.L.G.²	..	..	2·94	9·1			0·956	0·356	1330	119	397	..	..	..
	2·5-in.	400 lbs.	I. & II. L.¶	70·45	26·6	2·56	11·07	80	30	P.	$1\frac{1}{2}$ R.L.G.² or $1\frac{10}{16}$ R.L.G.	..	..	2·5	7·25		$\frac{4\cdot5}{16}$	0·819	0·488	1440	101	377	..	..	..
	7-pr.	200 lbs.	IV.	41·0	12·0	Unchambered		20	20	F.	$\frac{3}{4}$ R.F.G.	..	..	2·94	7·29		→ $\frac{7\cdot25}{16}$ / $\frac{14\cdot5}{16}$	1·185	0·287	950	46	515	..	..	..
R.B.L. GUNS (screw).	7-in.	82 cwt.	..	120·0	14·21	7·2	16·0	37	37	P.	11 R.L.G.²	..	..	7·0	91·25 / 108·3		$8\frac{4}{16}$ / $10\frac{5}{16}$	0·537	0·266	1100	909	222	..	..	..
	40-pr.	35&32cwt.	..	121·0 & 120	22·39	4·96	13·5	$36\frac{1}{2}$	$36\frac{1}{2}$	P.	5 R.L.G.²	..	..	4·75	40·7		$2\frac{6}{16}$	0·554	0·380	1160	380	217	..	..	..
	20-pr.	15&13cwt.	..	66·125	14·43	3·94	11·0	38	38	P.	$2\frac{1}{2}$ R.L.G.²			3·75	21·8		$1\frac{5}{16}$	0·645	0·414	1000	153	203	..	..	..
	12-pr.	8 cwt.	..	72·0	20·458	3·2	8·5	38	38	P.	$1\frac{1}{2}$ R.L.G.²			3·0	11·25		$\frac{8}{16}$	0·800	0·417	1239	200	299	..	..	..
	9-pr.	6 cwt.	..	62·0	17·5	3·2	7·0	38	38	P.	$1\frac{1}{8}$ R.L.G.²	..	..	3·0	8.56		$\frac{6}{16}$	1·052	0·317	1055	66	220	..	..	..

L., Land service only. * The Roman numeral is the number of the pattern given. Further differences in pattern are indicated by letters a, b, and c.
† P. means Polygroove; Pl., Plain; W., Woolwich; F., French; F.M., French modified; H., Henry; E.O.C., Elswick Ordnance Co.
‡ S.B.C. (in column for charge) means Slow-burning Cocoa; P.Bl. stands for Prismatic Black; P.Br. for Prismatic Brown; Pb., Pebble; R.L.G., Rifle Large Grain; L.G., Large Grain; E.X.E., Experimental letter E.
§ For the higher natures the weight of projectile given is for Palliser shot; for the lower natures it is for filled common shell. ** Cast steel. ‡‡ Forged steel. †† Double shell. ‖ Shrapnel.
¶ Mountain-service jointed gun. Note.—For 6-in. (Vickers) see Q.F. table. → Studded projectiles. c For steel common shell. d Estimated.

BRITISH RIFLED ORDNANCE—*continued.*

(Compiled from the official "List of Service Ordnance, 1898." Supplemented by subsequent information.)

Ordnance. Nature. Calibre or Pr.	Weight.	Mark and Service.*	Total length in inches.	Length of Bore, including Chamber.	Chamber. Diameter.	Chamber. Length to base of projectile.	Rifling. Twist one turn in Least at breech.	Rifling. Twist one turn in Greatest at muzzle.	Rifling. System.†	Charge (full). Weight.‡	Charge (cordite). Weight.	Charge (cordite). Size.	Projectile. Diameter.	Projectile. Weight.§	Projectile. Bursting Charge of Common Shell.	Projectile. Value of $\frac{d^3}{w}$.	Projectile. Value of $\frac{w}{d^3}$.	Muzzle velocity.	Ballistics (with full charges). Total muzzle energy.	Muzzle energy per ton of gun.	Perforation of wrought iron. At muzzle.	At 1000 yards range.	At 2000 yards range.
				cals.	ins.	ins.	cals.	cals.		lbs. / lbs. oz.	lbs. ozs.		ins.	lbs.	lbs.			f. s.	ft. tons.	ft. tons.	ins.	ins.	ins.
QUICK-FIRING GUNS																							
6·0 in.	7 tons	I. & III. / II. (Wire)	249·25	40	..	..	60	30										1882	2457	351	12·6	10·1	8·0
6·0 in. converted ..	5 „	I. to VI.	169·1	26·2	..	..	..	..	P.	29¾ E.X.E.	13 4	30	..	100·0	..	0·360	0·463	2200	3356	479	15·9	12·7	10·2
			166·6	26·6	..	..	..	..										1913	2537	362	13·0	10·3	8·2
6·0 in. (Vickers) ‡‡ ..	$7\frac{8}{20}$ tons	"BL. VII."	..	45	..	..	..	..	..	..	..	..	..	100·0	..	0·360	0·463	2642	††4840	654	21·0	16·7	13·4
4·7 in.	41 cwt.	I. II. III. &	194·1	40	..	...	100	34·4	E.O.C.	12 0 S.P.	5 7	20	4·72	45·0	..	0·495	0·428	1786	995 4	485·7	9·2	6·7	4·9
	42 „	IV. Wire					0	30										2188	1491	711	12·4*a*	9·2	6·6
4 in.	26 cwt.	I. II. III. Wire	165·25	40	..	..	..	30	M.Pl.	..	3 9	15	..	25·0	..	0·640	0·390	2456	1046	805	10·5*a*	6·9	4·9
		converted guns	120	28														2177	961	739			
12-pr.	12 cwt.	I.	123·6	40	..	..	120	28	E.O.C.	..	1 15	10	3·0	12·5	..	0·667	0·500	2210	423	677	8·1	5·3	3·5
							0	30	M.Pl.														
12-pr.	8 cwt.	I.	87·6	28	..	..	60	28	E.O.C.	..	13¾	10	3·0	12·5	..	0·667	0·500	1607	223·8	544	4·9	3·2	2·4
							0	30	M.Pl.														
Hotchkiss . 6-pr...	8 cwt.	I. & II.	97·63	40·0	..	..	180	29·9	M.Pl.	1 15 Q.F.	b7¾	5	2·24	6·0	..	0·836	0·534	1818	137·5	344·8	4·8	2·8	..
Nordenfelt . 6-pr...	6 cwt.	I. II. & III.	104·4	42·3	..	..				1 15 Q.F.													
Hotchkiss . 3-pr..	5 cwt.	I. & II.	80·63	40	..	..	25	25	M.Pl.	1 8 Q.F.	b6⅜	5	1·85	3·3	..	1·037	0·521	1873	80·3	321·2	4·1	2·1	..
Nordenfelt . 3-pr...	4 cwt.	I. L.	91·5	45·4									..	..	..	..	..	1920	84·3	337·2	4.3	2·2	..
MACHINE GUNS.										grains.				oz. grs.									
Nordenfelt, 2 bar 1-in.	180 lbs.	I.	52		..	..	35	35	H.	625 M.G.	..	..	1·0	7¼ 0	..	2·207	0·453	..	..	..	⅜-in. at 200 yards.		
„ 4 bar 1-in.	447 lbs.	III.**	57·0		..	..	35	35	H.														
„ 5 bar 0·45-in.	160 lbs.	I. G. G.	46·0		..	..	22	22	H.														
	143 lbs.	II. G. G.	42·25		..	..	22	22	H.														
Gardner, 1 bar 0·45-in.	76 lbs.	I. G. G.	47·0		..	..	22	22	H.	85 R.F.G$_2$.	..	..	0·450	480	..	2·952	0·751	..	..	..	Same as M.H. Rifle, which perforates ¼ in. wrought iron plate at 600 yds., 3/16 in. at 400 yds., ⅛ in. at 100 yds.		
„ 2 bar 0·45-in.	120 lbs.	I. G. G.	47·0		..	..	22	22	H.														
„ 5 bar 0·45 in.	268 lbs.	I. G. G.	53·5		..	..	22	22	H.														
Gatling, 10 bar 0·65 in.	787 lbs.	..	66·5		..	..	30	30	H.	270 R.F.G$_2$.	..	..	0·65	1422	..	2·109	0·730	..	..	..	Not known.		
„ 10 bar 0·45-in.	402 lbs.	I. G. G.	59·0		..	..	22	22	H.														
„ (Acclesfeed)	266 lbs.	I. G. G.	51·0		..	..	22	22	H.	85 R.F.G$_2$	..	..											
Maxim, 1 bar 0·45 in.	63 lbs.	I. G. G.	43·75		..	..	22	22	H.	31 Cordite	..	..	0·450	480	..	2·952	0·751	..	..	..	Same as M.H. Rifle.		
Maxim, converted ·45			45·0				10	27	Enf'ld														
			42·38				10	25·6	Metf'd														

... on land. The Roman numeral is the number of the pattern given. † P. means Polygroove; M.Pl., Modified plain; W., Woolwich; F., French; F.M., French modified

AUSTRIAN NAVAL ORDNANCE.

	Krupp Steel B.L. Guns.											Uchatius. St., Br.					Cast Iron BL.	Q.F. Krupp.				Q.F. Skoda.	
Designation by Calibre, in centimètres	30·5 L. 35 C. 80	26 L. 22	24 L. 35 C. 86	24 L. 22	21 L. 20	15 L. 35 C. 86	15 L. 35 C. 80	15 L. 26 K.Z.	15 L. 26 P.Z.	12 L. 35 C. 80	12 L. 35 C. 87	15 L. 25	15 L. 37	12 L. 35	9 L. 24	7 L. 15	15 L. 21	24 L. 40	15 L. 40	15 L. 35	12 L. 35	15 L. 40	12 L. 40
Calibre, in inches	12·01	10·24	9·45	9·27	8·24	5·87	5·87	5·87	5·87	4·72	4·72	5·87	4·72	4·72	3·43	2·60	5·87	9·45	5·87	5·87	4·72	5·87	4·72
Length: Total, in Feet	35·11	18·77	27·60	17·16	13·73	17·13	17·13	12·63	12·63	13·8	13·8	12·19	14·38	13·97	6·76	3·28	10·13	31·5	19·55	17·13	13·85	19·55	15·78
Length: Rifled Portion, in ins.	314·8	148·4	237·7	135·9	105·0	151·4	153·6	106·8	112·4	128·5	126·3	111·4	123·2	123·8	57·5	23·8	91·1	287·8	182·8	153·6	128·2	182·8	147·9
Length: Powder Chamber "	69·9	46·1	65·2	41·7	37·0	37·3	35·4	28·3	22·6	24·0	26·3	22·8	36·6	31·65	15·3	11·0	15·7	63·8	35·7	35·7	28·5	35·7	28·5
Length: Of bore in calibres	35	19·0	35	22·0	20·0	35	35·0	25·8	25·8	35·0	35	24·9	37	35·0	23·7	15·0	18·4	40	40	35	35	40	40
No. of Grooves	68	32	25	32	30	36	36	24	36	32	32	36	32	32	24	18	30	72	44	44	36	44	36
Twist in calibres	..	70	26·9	70	59	45—25	25	68·4	45	25	25	45	45—25	25	45	30	63·2	25	45·25	45·25	45·25	45·25	45·25
Weight: Gun, tons	47·2	21·7	26·6	14·5	8·68	5·7	4·69	3·94	3·94	2·25	2·31	3·35	3·15	2·85	0·479	0·09	2·81	27·8	4·48	3·75	1·97	4·33	19·7
Weight: Breech Block, in lbs.	3306·9	1951	1776·9	1422	1080	445·3	463·0	321·9	321·9	253·5	211·6	209·4	211·6	211·6	55·1	18·7	176·4	1450·6	328·5	328·5	211·6	291·0	189·6
Weight: Steel Shell "	1003·1	395·7	474·0	292·1	206·6	112·5	86·0	72·8	84·9	57·3	57·3	84·9	57·3	57·3	..	..	..	474·0	100·3	100·3	52·4	100·3	52·4
Weight: Chilled Shell "	..	..	..	..	196·2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Weight: Common Shell "	1003·1	354·2	474·0	263·5	172·0	112·5	69·9	67·2/65·5	69·4	57·3	57·3	69·45	57·3	57·3	14·02/14·22	6·42	6·11	471·0	100·3	100·3	52·4	100·3	52·4
Weight: Shrapnel Shell "	..	..	..	..	..	112·4	71·9	67·2/65·5	69·4	57·3	57·3	69·45	57·3	57·3	15·76	6·88	6·79	474·0	100·3	100·3	52·4	100·3	52·4
Weight: Case Shot "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	16·53	6·94	38·4	..	..	..	..	..	..
Weight of Bursting Charge: Steel Shell "	10·6	8·8	5·1	6·6	4·4	1·3	1·76	1·65	2·09	0·55	0·55	2·09	0·53	0·55	..	..	..	5·07	2·0	2·0	1·1	2·0	1·1
Weight of Bursting Charge: Chilled Shell "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4·72	8·82	8·82	4·6	8·82	4·6
Weight of Bursting Charge: Common Shell "	35·7	20·3	17·9	15·0	15·0	5·29	3·86	3·86	5·07	2 2	2·2	5·07	2·20	2·21	0·46	0·18	1·87	..	..	..	..	..	..
Weight of Bursting Charge: Shrapnel Shell "	..	..	..	..	..	1·26	1·10	1·08	1·08	0·57	0·57	1·08	0·57	0·57	0·20	0·09	0·90	..	..	..	..	..	..
Weight of Firing Charge: Steel and Chilled Projectile, in lbs.	156·5 24 cm.N	89·3 B	99·2N	76·1 B	50·7 C	22·5 15 cm.N	38·8*	21·6 C	20·9 C	19·8 B	12·13N	20·9 C	30·0 B	19·8 B	..	..	..	91·5	18·3	17·9	9·7	18·3	17·9
Weight of Firing Charge: Common Shell, in lbs.	156·5 N 24 cm.N	59·5	99·2N	44·1	30·9	22·5 15 cm.N	38·8*	14·3/21·6 C	20·9 C	19·8 B	12·13N	20·9 C	30·0 B	19·8 B	3·31/0·97	0·77 O/0·35	4·74O						
Weight of Firing Charge: Shrapnel, in lbs.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	11·9	11·9	4·6	11·9	4·4
Weight of Firing Charge: Exercising, in lbs.	154·3B	59·5	..	44·1	30·9	28·7	19·6	21·6 C	20·9 C	11·0	6·6 N	20·9 C	19·8 B	12·13 B	3·31	0·77 O/0·35	4·74O	63·9	11·9	11·9	4·6	11·9	4·4
Weight of Firing Charge: Saluting "	19·8	19·8 O	15·4O	15·4 O	8·82 O	4·74	4·74 O	4·74 O	4·74 O	2·4	2·4	4·74 O	2·4	2·4	0·88 O	0·35	4·74O						..
Muzzle Velocity, in feet	1969	1575	2100	1587	1519	2133	1969	1641	1562	1755	2133	1562	1755	1755	1470	978	1017	2264	2264	2133	2133	2264	2264
Muzzle Energy: Total, foot-tons	26,970	6808	14,500	5104	3306	3549	2312	1358	1435	1215	1808	1435	1224	1224	..	..	..	11,850	3565	3163	1647	3565	1856
Muzzle Energy: Per inch circumference, foot-tons	714·8	211·6	488·3	175·3	127·7	192·5	125·4	73·7	77·9	82·5	122·2	77·9	82·45	82·45	..	..	..	567·6	193·3	171·6	111·1	193·3	125·1
Thickness of Iron, perforated inches at Muzzle	28·0§	15·0§	27·4‡	13·7§	11·6§	14·5§	11·7§	8·8§	9·1§	9·4§	11·6§	9·1§	9·5§	9·5§	..	..	..	25·0	14·6	13·7	11·1	14·6	11·7
Ditto by Tresidder's formula.	30·1	14·7	25·8	13·4	..	16·1	12·6	8·9	8·9	9·7	12·9	8·9	9·7	9·7	..	..	..	29·0	17·0	15·5	12·5	17·0	13·7

NOTE.—C for cube powder; * prismatic powder; O, ordinary powder; B, brown prismatic. N, nitro-glycerine smokeless powder.
‡ By Krupp's formula. § By Fairbairn's formula.

DANISH NAVAL ORDNANCE.

	Krupp B.L. Guns designated.											Armstrong M.L.					Fins-poug.
Designation by Calibre	35·5 cm.	30·5 cm.	26 cm. long.	26 cm. short.	21 cm.	15 cm. long.	15 cm. medium.	15 cm. short.	12 cm. long.	12 cm. short.	8·6 cm.	10 in.	10 in.	10 in.	9 in.	8 in.†	6 in.
Calibre, in inches	13·98	12·01	10·24	10·24	8·24	5·91	5·91	5·91	4·72	4·72	3·43	10·0	10 in.	10 in.	9·0	8·0	6·04
Total length, in feet	29·1	22·0	32·8	18·77	24·04	17·1	12·63	10·7	11·8	9·6	6·9	17·0	14·5	14·0	13·0	10·8	9·5
Length of Bore, including Powder Chamber { in inches	304·7	227·2	327·6	194·5	264·5	190·3	135·0	112·9	128·8	102·4	73·6	175·5	145·5	140·0	125·0	104·2	100·8
Length of Bore, including Powder Chamber { in calibres	21·8	18·9	32·0	19·0	35	32·2	22·8	19·1	27·3	21·7	21·3	17·5	14·55	14·0	13·3	13·1	16·7
Number of Grooves	80	68	60	60	48	36	36	36	32	32	24	7	7	7	6	6	6
Twist of Rifling, in calibres	45	45	70–25	45	70–25	70–25	45	45	25	40	45	40	40	40	40	50	40
Total weight, including Breech-gear, tons	51·3	35·4	27·6	21·6	13·3	4·7	4·4	3·5	2·13	1·39	0·49	20·0	18·5	18·0	12·5	8·65	2·46
Weight of { Breech Block, lbs.	4695·8	2910	2006	1940	903·9	390·2	330·7	324·1	229·2	176·4	101·4	..	..	..	..	..	..
Weight of { Steel Shell, „	1157·4	725·3	451·9	451·9	238·1	112·4	..	86·0	..	44·1	..	400	400	400	..	..	..
Weight of { Chilled Shell, „	1157·4	725·3	..	451·9	..	..	86·0	86·0	..	44·1	..	400	400	400	250·2	165·3	..
Weight of { Common Shell, „	1157·4	725·3	451·9	451·9	238·1	112·4	69·4	69·4	57·3	36·2	15·2	400	400	400	250·2	131·2	55·1
Weight of { Shrapnel Shell, „	1157·4	725·3	451·9	451·9	238·1	112·4	86·0	86·0	57·3	44·1	..	..	..	..	..	..	15·4
Weight of { Case Shot, „	..	..	..	..	..	..	..	..	..	..	..	191·8	..	..	154·3	127·9	58·4
Weight of Bursting Charge { Common Shell, „	57·3	39·7	25·4	25·4	12·8	6·2	3·0	3·0	1·7	1·4	0·44	26·5	26·5	26·5	18·5	7·5	5·0
Weight of Firing Charge { Steel or Chilled Shell, lbs.	330·7	180·2	191·8	101·4	105·8	41·9	19·3	21·8	17·4	8·8	..	71·7	71·7	71·7	44·1	29·8	..
Weight of Firing Charge { Common Shell, „	330·7	180·2	191·8	112·4	105·8	41·9	19·3	21·8	17·4	8·8	3·3	71·7	71·7	71·7	44·1	19·8	60·6
Muzzle Velocity { Armour-piercing Projectile, feet	1762	1675	2018	1640	2021	1800	1565	1542	..	1416	..	1457	1368	1368	1368	1378	..
Muzzle Velocity { Common Shell, „	1762	1675	2018	1640	2021	1890	1683	1690	1720	1549	1457	1457	1368	1368	1368	1320	1076
Muzzle Energy { Total foot-tons	24910	14110	12770	8428	6745	2784	1461	1418	..	6130	..	5889	5192	5192	3246	2177	..
Muzzle Energy { Per inch circumference, foot-tons	568·3	374·1	396·8	262·0	260·6	150·0	78·7	73·0	..	32·8	..	189·0	165·3	165·3	115·8	86·9	..
Perforation at Muzzle, in ins. by Fairbairn's forma.	24·8	20·0	20·1	16·7	16·9	12·8	9·1	8·8	..	5·8	..	14·1	13·1	13·1	10·9	9·5	..
ditto ditto Tresidder's forma.	25·6	20·1	22·9	16·8	18·5	15·6	12·6	..	..	..	..	..	..	..	..	..	..

Note.—Chilled projectiles will gradually be replaced by steel. † There is another Armstrong gun differing very little from this one.
Krupp has supplied 12-cm. and 8·7-cm. Q.-F. guns, and Bofor's Q.-F. piece have been adopted and manufactured.

DUTCH NAVAL ORDNANCE.

	Krupp Breech Loading.							Armstrong Muzzle Loading.			Dutch Breech Loading.		
Designation by Calibre, in centimètres	28	21	17	15 No. 1.	No. 2.	12 No. 1.	12	28	23	18	12 No. 2.	12l	7·5
Calibre, in inches	11·02	7·91	6·80	5·87	5·87	4·72	4·72	11·00	9·00	7·00	4·72	4·72	2·95
Total Length, in feet	20·01	24·04	13·94	12·63	17·13	6·89	13·78	14·42	13·00	11·00	6·89	13·78	7·87
Length of Rifled Portion of bore, in inches	170·8	222·2	112·7	111·8	151·4	61·4	128·5	119·0	104·0	95·5	61·4	..	43·2
Length of Powder Chamber „	36·4	42·4	36·0	23·2	37·7	13·0	24·0	26·0	21·9	15·5	13·0	..	6·7
Length of bore, in Calibres	18·8	35	21·9	23·0	35	15·8	35	12·1	14·0	15·9	15·8	35	17·5
Number of Grooves	64	48/64	42	36	44	12	32	9	6	3	12	32	20
Depth of Grooves, inches	0·069	0·059	0·118	0·118	..	0·049	..	0·20	0·18	0·18	0·118	0·06	0·049
Twist of Rifling in Calibres	45	∝ 25	45	40	25	40	25	∝ 45	∝ 45	35	40	∝ 45	∝ 30
Total Weight, in tons	27·21	12·79/13·98	5·51	3·94	4·72	0·79	2·26	24·46	12·50	7·17	0·93	2·31	0·21
Firing Charge { Armour-piercing Projectile, in lbs.	121·3	99·2	27·6	20·9	49·6	..	19·8	86·0	50·7	30·0	..	19·5	..
Firing Charge { Common Shell „	121·3	99·2	27·6	20·9	49·6	2·43	19·8	86·0	50·7	13·9	2·43	19·8	0·82
Weight { Armour-piercing Projectile „	560·0	308·6	132·3	86·0	112·2	41·0	57·3	533·5	249·1	114·6	..	57·3	..
Weight { Common Shell „	476·2	308·6	112·4	69·4	112·2	29·5	57·3	535·7	262·4	116·8	29·5	57·3	9·5
Weight { Case Shot „	273·4	..	63·9	41·9	..	26·5	57·3	185·2	149·9	68·3	26·5	..	9·3
Bursting Charge { Armour-piercing Projectile „	6·6	4·6	2·2	1·1	..	0·44	..	4·4	2·2	2·2	..	..	..
Bursting Charge { Common Shell „	26·5	12·3	6·6	6·6	..	2·0	..	28·7	17·6	8·8	1.8	..	0·44
Muzzle Velocity, feet	1558	1739	1558	1558	2001	971	1755	1332	1476	1558	951	1804	958
Muzzle Energy { Total, in foot-tons	9423	6471	2226	1447	3115	..	1224	6563	3763	1929	..	1264	..
Muzzle Energy { Per inch Circumference, foot-tons	272	260·7	104	84	169·0	..	82·5	191	134	89	..	85·2	..
Perforation at Muzzle, in inches	17·0	16·8 / 17·1†	10·5	9·1	13·6 / 14·8†	..	9·4 / 10·1†	14·0	11·9	9·7	..	9·6	..
Metal employed or system of construction	Steel Jacket and Hoops.		Steel-hooped.		Steel Jacket and Hoops.	Steel-hooped.	Steel Jacket and Hoops.	Steel Tube and Wrought Iron.			Bronze.		

NOTE.—The 23-cm. ML. guns also discharge 113-Kg. (249·1 lbs.) steel shells and 113-Kg. solid shot. The 18-cm. ML. guns discharge steel shells of 51-Kg. (112·4 lbs.) and segment shells of 53–Kg. (116·8 lbs.). The 7·5-cm. BL. guns discharge ring-shells of 4·3 Kg. (9·5 lbs.). Of the older guns there are yet extant three sorts—rifled 16-cm. muzzle-loader (mostly bronze), and rifled bronze 7-cm. and 5-cm.

† By Tresidder's formula.

FRENCH NAVAL ORDNANCE.

Date and Pattern of Gun.	Model 1893.					Model 1887.				1870–81.	70–81. 70–84.	1884.					1881.									
Desig. by Calibre, in cms.	34·0	30·5	27·44	24·0	19·4	34	30·5	27	19	27	32	34	27	24	16	14	34 long.	34 short.	27	24	16 heavy.	16 light.	14	10	mm. 90	mm. 65
Calibre, in inches	13·39	12·0	10·8	9·45	7·64	13·39	12·0	10·80	7·64	10·80	12·6	13·39	10·80	9·45	6·49	5·45	13·39	13·39	10·8	9·45	6·49	6·49	5·46	3·94	3·54	2·57
Total length, in feet	..	..	..	..	..	..	..	..	..	23·97	27·93	..	28·47	24·89	17·04	..	33·69	25·32	27·12	23·70	15·14	15·14	14·3	8·6	7·1	3·58
Length of Bore, in inches	..	..	..	..	..	..	..	..	..	269·0	313·8	..	..	..	..	..	380·6	280·2	306 9	269·3	180·9	180·9	162·6	102·6	77·9	41·2
Length of Bore, in calibres	35	40	45	40	40	42	45	45	45	25	25	30	30	30	30	30	28·5	21·0	28·5	28·5	28	28	28	26	22	16
Number of Grooves	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	50	50	42	30	28	20
Depth of Grooves, inches	..	..	..	..	..	..	..	..	..	0·059	0·059	..	..	..	..	..	0·067	0·067	0·059	0·055	0·039	0·039	0·035	0·028	0·024	0·020
Rifling Twist	..	..	..	..	..	..	..	..	..	7°	7°	..	..	..	..	..	7°	7°	7°	7°	7°	7°	7°	7°	7°	8°
Total weight, in tons	52·9	45·9	34·9	22·4	10·6	60·0	49·2	37·1	10·6	24·6	42·3	50·8	27·7	17·9	5·4	3·15	52·2	47·2	27·4	17·7	4·9	3·9	3·2	1·18	0·54	0·09
Weight of Firing Charge: Armour-piercing Projectile lbs.	220·5	198 4	114·6	110·2	44·1	220·5	198·4	114·6	44·1	154·3	282·2 / 249·1	388·0	200·6	..	42·5	..	388·0	337·3	203·9	149·9	42·5	32·6	..	..	..	..
Weight of Firing Charge: Common Shell „	..	..	..	..	..	..	..	..	..	154·3	282·2 / 249·1	..	200·6	..	42·5	27·1	337·3	368·2	203·9	149·9	42·5	32·6	27·1	9·9	3·6	0·79
Weight: Armour-piercing Projectile * lbs.	925·9	643·8	476·2	317·5	165·3	925·9	643·8	476·2	165·3	476·2	760·6	925·9	476·2	317·5	99·2	..	925·9	925·9	476·2	317·5	99·2	99·2	..	..	..	..
Weight: Common Shell „	..	..	..	..	..	..	..	..	..	396·8	630·5	771·6	396·8	264·6	99·2	66·1	771·6	771·6	396·8	264·6	99·2	99·2	66·1	30·9	17·6	5·95
Weight: Case Shot „	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	130·7	130·7	61·7	39·0	19·5	7·7
Muzzle Velocity, in ft.-sec.	2625	2625	2625	2625	2625	2625	2625	2625	2625	1887	1985 / 1804	1969	1969	1969	1969	1969	1969	1804	1969	1969	1969	1821	1936	1673	1493	1135
Muzzle Energy: Total, in foot-tons	44230	30750	22750	15170	7898	44230	30750	22750	7898	11760	20780 / 17160	24900	12800	8539	2668	1777	24900	20880	12800	8539	2668	2080	..	..	..	..
Muzzle Energy: Per in. circ., foot-tons	1052	815·8	670·7	511·1	329·1	1052	815 8	670·7	329·1	346·6	525·0 / 433·5	591·9	377·5	287·7	130·8	103·9	591·9	496·6	377·5	287·7	130·9	121·3	..	..	..	..
Perforation at Muzzle, inches	42 5†	37·3†	33·7†	29·4†	13·4†	42·5†	37·3†	33·7†	23·7†	20·6†	26·1† / 22·6†	27·6†	22·0†	19·2†	18·0†	10·7	27·6†	24 2†	22·0†	19 2†	13·0†	11·6†	..	..	..	..
„ „ „	..	..	..	..	..	..	..	..	..	..	..	26·6‡	21·1‡	18·4‡	12·4‡	..	26·6‡	..	21·1‡	18·4‡	..	..	..	..	..	..

* Steel or chilled iron. † By Tresidder's formula. ‡ By Krupp's formula.

FRENCH NAVAL ORDNANCE—*continued.*

Date and Pattern of Gun.	75–79.	Jacketed. 1870.		Jacketed. 75	75	1875				1870.				
Desig. by Calibre, in cms.	37	27	14	27 No. 1	10	42†	34	27 No. 1	10	27	24	19 long	16	14
Calibre, in inches	14·57	10·79	5·46	10·8	3·94	16·54	13·39	10·8	3·91	10·8	9·45	7·64	6·49	5·46
Total length, in feet	36·7	17·7	10·3	19·3	9·3	32·5	22	19·3	9·3	17·7	16·21	13·6	12·2	10·3
Length of Bore, in inches	414·0	194·3	115·0	213·4	104·3	366·0	241·5	213·4	104·3	194·3	179·1	151·0	137·3	115·0
Length of Bore, in calibres	28·5	18	21	19·7	26	22	18	19·8	26	18·0	19	19·7	19	21
Number of Grooves	..	54	28	54	20	84	68	54	20	54	48	28	50	28
Depth of Grooves, inches	0·079	0·059	0·047	0·059	0·032	0·079	0·059	0·059	0·032	0·059	0·059	0·059	0·039	0·047
Rifling Twist	7°	4°	4°	4°	7°	7°	4°	4°	7°	4°	4°	4°	7°	4°
Total weight, in tons	**75·1	22·8	2·6	27·9	1·18	74·8	47·6	27·6	1·18	22·8	15·4	7·9	4·92	2·66
Weight of Firing Charge: Armour-piercing Projectile * (lbs.)	463	136·7	..	165·3	..	601·1	304·2	136·7	..	92·6	62·8	33·1	39·7	..
Weight of Firing Charge: Common Shell (,,)	463	126·8	11·2	145·5	10·1	..	231·5	121·3	7·1	92·6	62·8	33·1	39·7	9·0
Weight: Armour-piercing Projectile (lbs.)	1235	476·2	..	476·2	..	1719·6	925·9	476·2	..	476·2	317·5	165·3	99·2	..
Weight: Common Shell (,,)	1014	396·8	61.7	396·8	30·9	1433·0	771·6	396·8	26·3	396·8	264·6	137·8	99·2	46·3
Weight: Case Shot (,,)	..	321·9	42·8	321·9	18·7	..	..	321·9	18·7	321·9	211·6	..	68·3	39·7
Muzzle Velocity, in ft.-sec.	1969	1608	1529	1640	1673	1663	1722	1641	1591	1424	1444	1470	1782	1332
Muzzle Energy: Total, in foot-tons	33210	8515	..	8880	..	17750	19160	8865	..	6695	4592	2477	2183	..
Muzzle Energy: Per in. circ., foot-tons	725·4	251	..	261·7	..	422	456	261	..	197·3	154·7	103·2	107	..
Perforation at Muzzle, inches	:0·5†	16·2†	..	16·7†	..	26·3†	22·6†	16·7	..	20·53	20·3	10·4	10·8	..

Date and Pattern of Gun.	Q.-F. Guns. 16§	16‡	14§	14	Mod. 92. 10	Mod. 91. 10	Mod. 8 1 ‡
Desig. by Calibre, in cms.	16·47		13·86		10·00		
Calibre, in inches	6·46		5·44		3·94		
Total length, in feet							
Length of Bore, in inches							
Length of Bore, in calibres	45	30	45	30	60	50	26
Number of Grooves							
Depth of Grooves, inches							
Rifling Twist							
Total weight, in tons	6·89	4·92	4·13	3·81	2·19	1·62	1·1
Weight of Firing Charge: Armour-piercing Projectile * (lbs.)	30·2	19·0	16·1	12.8	8·16	8·16	5·0
Weight of Firing Charge: Common Shell (,,)							
Weight: Armour-piercing Projectile (lbs.)	99·21		66·14		30·87		
Weight: Common Shell (,,)							
Weight: Case Shot (,,)							
Muzzle Velocity, in ft.-sec.	2625	2100	2625	2100	2625	2625	203
Muzzle Energy: Total, in foot-tons	4730	3061	3160	2022	1475	1475	885·
Muzzle Energy: Per in. circ., foot-tons	233·5	150·9	184·9	118·7	119·2	71·6	71
Perforation at Muzzle, inches	20·0†	14·4†	17·7†	12·7†	14·3†	14·3†	9·

* Steel or chilled iron. ** Made at St. Chamond. The Creusôt gun weighs 71·4 tons. † By Tresidder's formula.

‡ Models 1881 and 1884 converted guns. § There are three models of the years 1887, 1891 and 1893, of slightly different weight from the above.

GERMAN NAVAL ORDNANCE.

	Krupp Steel Breech-loading Guns, designated by calibre.																					Bronze B.L.
Designation in centimètres	30·5 jack'd.	28	28	26 long.	26 jack'd.	26 short.	24 long.	24 long.	24 long.	24 short.	21 long.	21 long.	17 long.	15 long.	15 short jack'd.	15 short.	15 short jack'd.	12·5 hoop'd.	10·5 long.	8·7	6¶	8
Calibre, in inches	12·01	11·02	11·02	10·33	10·33	10·33	9·45	9·45	9·45	9·37	8·24	8·24	6·80	5·87	5·87	5·87	5·87	4·92	3 96	3·43	2·36	3·19
Length: Total, in feet	21·98	36·75	32 15	18·77	18·77	17·06	31·50	27.56	23·63	15·45	24·0	20·61	13·94	14·67	10·73	10·73	10·68	9·60	12·08	6·89	4·1	5·15
Length: Rifled portion, in ins.	181·9	§407·9	§352·8	149·8	150·0	129·3	349·6	302·4	201·6	116·2	218·2	176·5	117·1	128·5	93·3	87·1	87·1	85·7	113·6	62·7	44·3	45·9
Length: Powder Chamber†, "	45·3			44·7	44·4	44·7	..	..	53·5	40·9	75·3	46·7	31·5	31·1	19·0	25·1	25·1	16·7	19·5	10·7	..	9·73
Length: Bore, in calibres	18·9	40	35	18·8	18·8	16·8	..	..	26·1	16·8	35·6	27·1	21·9	27·2	19·1	19·1	19·1	20·8	33·6	21·4	..	17·4
Number of Grooves	72	..	..	36	48	36	..	..	56	48	48	48	30	36	36	36	36	32	32	24	24	12
Depth of Grooves, in inches	0·079	..	..	0·077	0·079	0·077	..	..	0·059	0·061	0·059	0·059	0·063	0·059	0·061	0·061	0·061	0·059	0·049	0·049	..	0·051
Twist, in calibres	45	..	..	50	50	50	..	..	25*	45	25*	25*	45	25*	45	45	50	40*	25*	40*	..	46
Weight: Gun, including Breech Gear, tons	35·4	43·4	43·2	21·7	18·7	17·7	25·4	21·7	18·7	14·6	13·03	12·3	5·51	4·04	3·44	3·44	3·15	1·38	1·15	0·44	0·10	0·23
Weight: Breech Block, in lbs.	2954	..	..	2050	1973	1973	..	..	..	1378	831·1	908·3	496·0	390·2	324·1	324·1	324·1	163·1	149·9	86·0	..	55·1
Weight: Armour - piercing projectile,‡ in lbs.	725·3	562·2	562·2	412·3	412·3	412·3	474·0	474·0	474·0	306·4	308·6	308·6	117·9	112·4	76·1	76·1	76·1	..	..	..	..	..
Weight: Common Shell, in lbs.	725·3	474·0	474·0	357·1	357·1	357·1	474·0	474·0	474·0	261·5	308·6	308·6	112·9	112·4	65·0	65·0	65·0	40·1	39·7	14·9	6·61	8·3
Weight of Bursting Charge: Armour - piercing Shell, in lbs.	7·7	..	..	5·3	5·3	5·3	7·05	7·05	6·6	3·2	5·5	5·5	1·3	1·5	0·8	0·8	0·8	..	..	..	..	..
Weight of Bursting Charge: Common Shell, in lbs.	19·8	25·4	25·4	14·3	14·3	22·0	16·5	16·5	15·4	15·4	12·1	12·1	5·1	4·3	4·2	4·2	4·2	2·4	0·9	0·4	..	0·6
Weight of Firing Charge: Armour - piercing Shell, in lbs.	202·8	352·7	297·6	105·8	105·8	125·7	..	..	152·1	67·2	103·6	103·6	30·9	33·1	14·3	17·1	17·1	..	..	..	..	..
Weight of Firing Charge: Common Shell, in lbs.	202·8	352·7	297·6	105·8	105·8	125·7	..	..	152.1	50·7	103·6	103·6	30·9	33·1	14·3	17·1	17·1	8·8	8·8	3·3	0·88	0·9
Initial Velocity: Armour - piercing projectile, ft.-sec.	1713	2362	2133	1588	1588	1578	2067	1903	1657	1493	1739	1657	1608	1624	1463	1463	1463	..	..	..	..	..
Initial Velocity: Common shell, ft.-sec.	1713	..	..	1641	1641	1654	2067	1903	1657	1391	1739	1657	1654	1624	1555	1555	1555	1545	1526	1545	1545	1053
Muzzle Energy: Total, foot-tons	14,750	21,750	17,740	7211	7211	7119	14050	11910	9024	4736	6471	5876	2112	2055	1131	1131	1131	..	..	..	..	..
Muzzle Energy: Per in. circ., ft.-tons	391	628·4	512·4	223	223	220	473·3	401·2	304	161	250·0	227	98·9	111·5	61·3	61·3	61·3	..	..	..	..	..
Perforation at Muzzle, in ins.	20·5	‖30·7	‖26·3	15·4	15·4	15·3	‖26·8	21·0	18·1	13·0	16·4	15·6	10·3	11·0	8·0	8·0	8·0	..	..	..	..	..
Ditto by Tresidder's formula	20·8	30·6	26·7	15·1	15·1	15·0	25·3	22·2	18·0	..	16·8	15·6	10·2	..	..	..	..	..	..	..	..	..

NOTE.—There are also quick-firing guns; see Table of Krupp Q.-F. guns. * Maximum twist. † Including taper entrance into bore.
‡ In most cases steel shells. § Length including powder chamber. ‖ Iron by Krupp's formula. ¶ Boat gun for landing and working ashore.

ITALIAN NAVAL ORDNANCE.

	Armstrong Breech Loading.				B.L.	Armstrong Muzzle Loading.							Muzzle Loading. Old Pattern.		Breech Loading.		Armstrong Quick Firing.			
Designation by Calibre, in centimètres	43·1‡ New Pattern.	43·1‡ Early Pattern. 1882.	34·3	12·0	12·0	45·0	27·9 New Pattern.	25·4 No. 1 Long.	25·4 No. 2 Short	25·4 No. 2.	22·8	20·3	16	16	7·5 No. 1.	7·5 No. 2.	15·2†	14·9	12·0*	12·0§
Calibre, in inches	17	17	13·5	4·72	4·72	17·72	11	10	10	10	9	8	6·5	6·5	3	3	6·0	5·87	4·7	4·7
Length { Total, in feet	40·75	39	36·09	8·5	9·25	32·7	14·4	14·4	14	13·8	13·8	10·8	11·8	10·6	5·8	3·3	13·8	13·87	16·2	13·0
Length { Rifled Bore, in inches	346·8	315·7	..	75	88	302	121	120	114	112	106	89	96	87	52	27	126	..	189	..
Length { Powder Chamber, in inches	84·5	98	..	10·8	22	56·5	24·5	26·0	26·0	14·0	19·5	15·7	21·3	21·3	10·2	7·9	28	..		..
Length { Bore, in Calibres	27	26	..	20·2	23·5	20·5	13·2	14·6	14·0	12·6	13·9	13·1	16·8	15·5	20·7	11·7	26	..	40	35
No. of Grooves	82	82	56	37	36	28	9	7	7	8	6	6	6	6	12	12	28	28	22	22
Twist of Rifling, in Calibres	50	50	..	40	42	50	35	40	40	55	45	45	42·5	27·3	48	48	40	40	34·4	..
Total Weight, in tons	104·3	101·5	67·9	1·20	1·38	100	25·0	18·0	18·1	12·1	12·6	6·99	5·12	3·54	0·29	0·095	4	4·2	2·05	1·69
Firing Charge { Armour-piercing projectile, lbs.	900·0	725	630·5	5·5	9·9	551	95·2	77·6		63·9	59·7	37·7	19·8	..	..	..	39·7	26·5	12·0	..
Firing Charge { Common Shell, „	600	480	..	5·5	9·9	63·0	66·6	52·9		41·9	37·7	26·7	7·3	7·1	1·9	0·7	26·5	40	12·0	..
Weight { Armour-piercing projectile, „	2000	2000	1250	52·0	52·2	2000	540·1	451·9		331·8	315·3	191·8	103·6	..	..	..	80		45·0	36·0
Weight { Common Shell, „	2000	2000	1250	31·7	36·8	2000	526·9	399·0		284·4	250·0	180·0	64·6	65·7	9·4	9·4	80	about 80·0	..	36·2
Weight { Shrapnel „ „	2017	2017	1250	37·3	37·37	2180	533·5	399·0		284·4	250·0	180·0	68·3	..	9·4	9·4	80		..	29·8
Weight { Case Shot „	..	..	..	32·4	35·9	..	200·1	188·1		135·6	99·6	79·4	33·1	33·1	9·0	9·0	70	..	..	..
Bursting Charge { Armour-piercing projectile, „	32	32	17·4	2·31	2·31	32 ?	15·0	12·3		8·4	6·5	3·8	..	..	..	..	1·5	..	..	1·83
Bursting Charge { Common Shell, „	60	60	87·1	2·2	2·2	78 ?	26·0	23·8		18·2	18·8	9·7	2·87	2·87	0·31	0·31	5	..	..	3·02
Bursting Charge { Shrapnel „ „	5	5	4·25	0·35	0·35	5 ?	2·2	2·20		1·96	1·80	1·17	0·55	..	0·03	0·03	0·16	..	..	0·35
Muzzle Velocity, in feet	1992	1935	2016	1345	1591	1700	1353	1388		1373	1284	1311	1290	1024	1335	..	1946	..	1786	..
Muzzle Energy { Total, foot-tons	55,030	51,930	35,230	650·4	916·4	40,060	6857	6035		4369	3604	2286	1195	..	..	..	2100	..	995·4	..
Muzzle Energy { Per inch circumference, foot-tons	1035	976·3	830·8	43·9	61·8	753·4	198·5	192·2		139·1	127·6	91·0	58·5	..	..	..	114·1	..	67·1	..
Perforation at Muzzle, inches of iron	33·7	32·8	30·2	6·7	8·1	27·8	14·3	14·1		12·0	11·4	9·6	7·7	..	..	..	**11·4	..	**8·8	..
„ by Tresidder's formula	36·7	35·0	33·0	..	8·3	28·2	..	..		..	..	..	..	..	..	..	11·8	..	9·2	..
Metal employed in structure	St.	I. & St.		St.	St.	Steel tube in Wrought Iron jacket.							I. & St.	Cast I.	Br.	Br.			St.	

St. stands for steel, I. for iron, Br. for Bronze.

* For Piemonte. ** By Krupp's formula. † For Piemonte, Fieramosca, Re Umberto, Ancona, Doria.

‡ There are four types of these bores, viz.: types Lauria, Lepanto, Italia, Valente. § For Duilio, Dandolo, Formidabile. The Piemonte has a 40-calibre gun.

RUSSIAN NAVAL ORDNANCE.

	Obukhoff Steel Breech Loading Hooped Guns.																Steel B.L. Guns.		
Designation by Calibre, in inches	12	12 Long.	12 M. 77.	11 M. 67.	11 Pattern 77.	9	9 [a] M. 67.	9 [b]	8	8	8 M. 67.	6 Long.	6	6·03	6	Long 9-pdr.	4·2 (9-pdr.)	3·43 Long (4-pdr.)	3·43 (4-pdr.)
Calibre in centimètres	30·48	30·48	30·48	27·94	27·94	22·86	22·86	22·86	20·32	20·32	20·32	15·24	15·24	15·32	15·24	10·67	10·67	8·70	8·70
Total Length, in feet	**35	30	20	18·3	20·0	**26·25	15·0	13	**23·33	**20	14·6	**17·5	14	12·2	11·7	6·9	7·0	6·9	5·8
Length of Rifled Portion of Bore, in inches	..	..	165·0	152·0	158·0	..	124·0	..	..	..	128·0	..	118·7	106·0	98·0	61·5	65·0	62·6	53·0
Length of Powder Chamber, in inches	..	..	38·5	35·0	50·4	..	28·5	..	..	..	23·0	..	30·5	22·4	22·2	10·5	8·0	10·7	..
Length of Bore in calibres, including Powder Chamber	**35	..	17	17	18·9	**35	16·9	..	**35	**30	18·9	**35	24·9	21·3	20	17·1	17·4	21·4	..
Number of Grooves, in inches	..	..	36	36	64	..	32	32	..	..	30	..	..	24	24	24	16	24	12
Depth of Grooves "	..	0·070	0·135	0·135	0·135	..	0·110	0·110	..	..	0·090	..	0·060	0·085	0·070	0·055	0·055	0·050	0·050
Twist of Rifling in calibres	..	..	73·5	70	..	..	60	60	..	..	70	..	*24	60	68	*40	50	40	41
Total Weight, in tons	55·7	50·45	39·9	28·2	28·2	19·44	15·0	12·5	13·64	12·74	9·65	6·26	4·08	4·35	4·03	0·60	0·87	0·45	0·35
Weight of Steel Shell, in lbs.	..	..	665·8	515·9	..	..	249·1	275·6	..	..	172·0	..	90·9	97·6	86·0	..	..	..	..
Weight of Chilled Shell, "	..	731·9	665·8	515·9	562·2	..	275·6	264·7	..	193·1	169·8	..	119·0	86·0	86·0	..	..	..	..
Weight of Common Shell, "	626·4	..	639·3	496·0	520·3	268·2	266·8	266·8	192·3	172·4	172·0	73·35	..	81·6	81·6	27·6	24·2	15·2	12·6
Weight of Case Shot, "	..	..	293·2	216·1	..	..	176·4	176·4	..	..	134·5	..	..	57·3	57·3	27·6	22·3	15·2	11·0
Weight of Firing Charge: Steel Shell, "	..	..	144·4	115·3	..	..	64·2	47·0	..	..	31·5	89·38	..	14·3	18·1	..	..	..	..
Weight of Firing Charge: Chilled Shell, "	..	246·9	144·6	90·6	132·2	..	47·0	47·0	..	72·0	29·3	39·6	37·8	14·3	18·1	..	..	..	..
Weight of Firing Charge: Common Shell, "	..	..	117·3	81·6	132·2	180	42·1	42·1	88·2	72·0	28·4	39·6	..	10·8	14·3	4·5	2·6	3·1	1·3
Muzzle Velocity, in feet	..	1942	1470	1486	1516	2376	1463	1260	1925	1796	1352	2080	‡1739	1206	1463	1225	..	1444	..
Muzzle Energy: Total, foot-tons	..	19140	9974	7903	8960	10500	4095	3035	..	4321	2180	2682	1905	982	1276	..	..	..	..
Muzzle Energy: Per Inch Circumference, foot-tons	..	508·4	264·6	228·8	259·3	371·4	144·7	107·4	..	172·0	86·7	142·3	101·1	51·8	67·74	..	..	..	..
Perforation at Muzzle, in inches	..	23·6	16·7	15·5	16·5	20·2	12·3	10·5	..	13·5	9·5	12·50	10·5	7·2	8·4	..	..	..	..
Ditto by Tresidder's formula	..	25·3	..	..	..	†24·0	..	..	†15·7	†14·2	..	..	†12·2	..	..	..	..	..	..

** It is doubtful if this refers to the total length of gun or of bore. * Maximum of increasing twist. † The weight of the projectile is uncertain. ‡ With pyroxiline. a Now. b Converted. There exist also 15 and 10·7-cm. Krupp guns.

NOTE.—The Russians certainly possess some more powerful pieces than are here shown.

SPANISH NAVAL ORDNANCE.

	Hontoria, Pattern 79. B.L.				Hontoria, Pattern 83. Breech Loading.							
Designation by Calibre	18-cm	16-cm No. 1.	16-cm No. 2.	16-cm No. 3.	32-cm.	28-cm.	24-cm.	20-cm.	18-cm	16-cm.	14-cm	12 cm.
Calibre, in inches	7·09	6·30	6·30	6·30	12·60	11·02	9·45	7·87	7·09	6·34	5·51	4·72
Length: Total length, in feet	15·57	13·8	9·50	9·65	38·7	33·8	29·0	..	21·75	19·3	16·91	14·5
Length: Rifled Portion, in inches	141·2	125·6	83·1	..	352·4	309·1	..	..	..	170·6	149·1	126·0
Length: Powder Chamber, in inches	..	31·9	17·3	..	86·8	77·1	..	..	..	49·8	53·9	39·4
Length: Bore, in calibres	..	25	17	..	50	50	30	..	30	35	35	35
No. of Grooves	42	38	3·8	..	80	70	60	50	45	40	35	30
Depth of Grooves, in ins.	0·06	0·06	0·06	..	0·06	0·06	0·05	0·06	0·04	0·04	0·04	0·04
Twist of Rifling, in cals.		Increasing from 10 to 40.	56	..	From 0 to 30.							
Total Weight, in tons	7·87	5·6	48·0	..	47·3	32·5	20·7	11·5	8·71	6·1	4·1	2·6
Weight: Armour piercing projectile, in lbs.	135·6	93·7	93·7	..	1041	694·3	438·7	253·5	187·4	130·1	86·0	53·1
Weight: Common Shell, in lbs.	113·8	83·6	83·6	..	879·6	586·4	370·4	213·8	..	112·4	75 0	47·2
Weight: Ring Segment, in lbs.	..	83·8	83·6 / ..	63·9 / 63·9	886·3	590·8	370·4	211·6	..	112·4	75·0	47·6
Firing Charge: Armour-piercing projectile, in lbs.	..	26·5	..	15·4	485·0	352·7	220·5	112·4	94·8	66·1	44·1	28·7
Firing Charge: Other projectiles	..	24·3	..	15·4	463·0	319·7	220·5	..	..	61·7	..	28·7
Muzzle Velocity, in feet	..	1631	1493	..	2034	2034	2034	2034	2034	2051	2001	1988
Muzzle Energy: Total, in ft.-tons	..	1550	1448	..	29850	24030	12580	7271	5374	3806	2386	1511
Muzzle Energy: Per inch circumference, ft.-tons	..	87·4	73·2	..	754·3	694·0	423·9	294·1	241·4	191·1	137·8	101·9
Perforation at Muzzle, in inches	..	†9·3	8·8	..	†.2·9	†28 7	†24·6	†20·5	†18·6	†16 6	†13·9	†11·6
Metal and Construction	St. & Cast Iron.				St. Jacket and Hoops.							

	Armstrong, Pattern 83.				Armstrong. Muzzle Loading.		Armstrong. Pattrn. 81 B.L.
Designation by Calibre	15-cm.	12-cm.	8·7-cm	7·5-cm long.	22 86-cm	20·3-cm	6-in.
Calibre, in inches	6·00	4·72	3·4	2·95	9·00	8·00	6·00
Length: Total length, in feet	16·97	13·75	7·9	7·50	13·0	11·0	14·5
Length: Rifled Portion, in inches	158·3	135·8	75·0	70·7	104·0	102·0	126·9
Length: Powder Chamber, in inches	31·4	19	13	13	..	..	29·7
Length: Bore, in calibres	32	33	27	28·7	14	14·75	26·1
No. of Grooves	28	22	20	18	6	4	28
Depth of Grooves, in ins.	0·037	0·03	0·03	0·03	0·18	0·18	..
Twist of Rifling, in cals.	30	40	30	35	45	40	100 to 40
Total Weight, in tons	5·0	2·2	0·45	0·35	12·0	9·0	4·0
Weight: Armour piercing projectile, in lbs.	97·0	39·2	..	..	250·0	180 0	78·3
Weight: Common Shell, in lbs.	92·6	36·4	14·1	11·5	250·0	180 0	73·6
Weight: Ring Segment, in lbs.	..	38·6	15·4	11·7	..	..	83·6
Firing Charge: Armour-piercing projectile, in lbs.	48·5	16·0	..	..	50·0	35·0	34·0
Firing Charge: Other projectiles	30·0	11·9	4·0	4·0	33·0	21·0	24·9
Muzzle Velocity, in feet	2070	2000	1625	1709	1339	1339	1929
Muzzle Energy: Total, in ft.-tons	2882	1087	258	233	3105	2239	2018
Muzzle Energy: Per inch circumference, ft.-tons	153 3	73·33	..	..	110·0	89·1	1071
Perforation at Muzzle, in inches	†14·4	†9·3	..	..	10·6	9·6	†11·0
Metal and Construction	St.				St. and Wt. I.		St.

	Krupp. Breech Loading.				Converted. Q.F. guns.			Garcia de Loma. Q.F.
Designation by Calibre	15-cm.	12-cm.	8·7-cm	7·5-cm	14-cm. M. 83	12-cm. M. 83	7-cm. M. 79	10-cm
Calibre, in inches	5·87	4·72	3·43	2·95	5·51	4·7	2·76	3·9
Length: Total length, in feet	17·13	11·81	6·9	6·6	17·4	..	3·71	18·2
Length: Rifled Portion, in inches	..	..	..	57·6	..	..	..	..
Length: Powder Chamber, in inches	..	..	..	..	..	..	..	..
Length: Bore, in calibres	35*	30*	24*	25·8*	..	..	..	..
No. of Grooves	36	32	24	24	..	..	..	..
Depth of Grooves, in ins.	0·06	0·06	0·05	0·05	..	..	..	..
Twist of Rifling, in cals.	25	25	40	36	..	..	..	..
Total Weight, in tons	4·7	2·1	0·44	0·30	4·23	..	0·98	1·67
Weight: Armour piercing projectile, in lbs.	84·9	43·65	..	..	‡154·3	‡112·4	..	32·4
Weight: Common Shell, in lbs.	65·5	34·61	14·6	9·48	‡145·5	‡108	7 3	28·2
Weight: Ring Segment, in lbs.	..	34·61	14·6	9·04	‡145·5	‡108	8 2	28·7 / 17·2
Firing Charge: Armour-piercing projectile, in lbs.	37·48	19·29	..	..	..	..	..	17·2
Firing Charge: Other projectiles	25·4	..	10·3	10·4	..	..	..	..
Muzzle Velocity, in feet	2001	1887	1539	1552	..	..	1136	..
Muzzle Energy: Total, in ft.-tons	2357	1076	..	..	..	..	..	..
Muzzle Energy: Per inch circumference, ft.-tons	127·8	72·6	..	..	..	..	..	..
Perforation at Muzzle, in inches	†12 7	†9·7	..	..	..	..	..	..
Metal and Construction	St.							

18 and 16-cm. Palliser guns and 16 and 13-cm. Parrot guns also exist, and some bronze muzzle loaders. St. stands for Steel; I. for Iron.

There is also a 20-cm. (7·87-in.) B.L. Hontoria, Pattern 79, weighing 10·8 tons, firing an armour-piercing projectile weighing 180·8 lbs. with a charge of 61·73 lbs.

* Total length, the length of bore not being supplied. † By Krupp's formula. ‡ These weights include the charge and case.

NAVAL ORDNANCE OF SWEDEN AND NORWAY.

	Sweden.													Norway.										
	Breech Loaders.			Model 76.		Model 81.		Model 83.		M. 85.	M. 86.	M. 89.	M. L.	Krupp, B.L.					Armstrong, M.L.				Palliser, M.L.	
Designation by Calibre, in cms.	27	24	17	27	24	27	12	15	8	25	6·5	15	12	26 No. 2.	26 No. 1.	15	12 No. 2.	12 No. 1.	26·7 No. 3.	26·7 No. 2.	26·7 No. 1.	20·2	16·7	15·5
Calibre, inches	10·80	9·45	6·58	10·80	9·45	10·80	4·72	6·00	3·31	10·00	2·60	6·0	4·80	10·24	10·24	5·91	4·72	4·72	10·51	10·51	10·51	7·94	6·58	6·11
Total Length, feet	17·46	14·96	11·27	17·65	16·24	23·10	10·29	13·87	7·37	28·33	3·79	16·98	8·87	25·59	18·77	12·63	13·78	9·60	16·87	14·65	13·45	10·82	11·58	10·30
Length { Rifled Portion of Bore, ins.	160·8	137·0	107·8	159·2	150·5	191·6	94·5	124·1	71·3	2609	35·0	155·2	83·3	218·9	160·4	112·4	128·6	85·9	138·7	121·0	110·6	85·7	92·4	91·7
Length { Chamber, "	29·9	25·9	16·5	32·3	28·1	66·2	20·6	31·1	9·7	58·1	4·2	35·2	13·6	55·4	34·1	22·6	36·8	16·5	36·8	24·0	20·6	18·5	19·3	10·8
Length { Bore in calibres, "	17·2	17·1	18·7	17·8	18·9	23·9	24·0	25·7	24·3	32·9	15·4	32	20·2	30	19·0	22·8	35	25	16·7	13·8	12·5	13·2	17·0	16·8
Number of Grooves	5	5	5	42	36	45	30	28	24	42	26	28	8	60	60	36	32	32	8	8	8	6	3	3
Twist of Rifling	30*	30*	30*	45*	..	40*	30*	30	33*	40*	22*	30	40	∝25	45	45	∝25	40	55	55	55	50	34	34
Total Weight, tons	23·6	14·4	5·2	23·6	16·4	27·1	1·9	4·2	4·2	29·8	9·4	5·2	1·9	24·8	21·7	3·9	2·31	1·38	21·7	19·7	18·2	7·4	4·9	3·4
Weight of { Armour-piercing Shell in lbs.	476·2†	317·5†	107·1†	476·2†	317·5†	476·2†	..	100·0	..	449·7	..	100	..	606·3	463·0	86·0	57·3	44·1	448·6	393·5	384·9	157·4	109·8	..
Weight of { Common Shell, in lbs.	396·8	224·9	97·7	396·8	273·4	396·8	48·5	100·0	14·8	401·2	6·2	100	34·6	606·3	381·4	69·4	57·3	36·1	316·4	316·4	316·4	153·9	82·7	59·1
Weight of Firing Charge { Armour-piercing Shell, in lbs.	83·8	59·5	22·0	90·4	56·2	206·4	..	35·3	..	242·5	..	54·0	..	191·8	99·2	22·0	19·8	9·9	110·2	82·7	66·1	29·8	22·0	..
Weight of Firing Charge { Common Shell, lbs.	83·8	59·5	22·0	90·4	56·2	145·5	16·0	35·3	3·3	242·5	0·9	..	6·6	191·8	81·6	20·9	19·8	9·9	77·2	77·2	48·5	29·8	16·5	7·72
Muzzle Velocity, feet.	1322	1312	1365	1378	1365	1788	1640	1663	1542	2100	1148	2067	..	1722	1575	1624	1804	1493	1549	1444	1296	1247	1329	1116
Total foot-tons	5771	3789	1384	6272	4102	10550	..	1918	..	13750	..	2964	..	12460	7966	1573	1290	680	7463	5692	4484	1696	1345	..
Muzzle Energy { Per inch Circumference.	170·1	127·6	66·9	184·9	138·2	311·3	..	101·7	..	437·7	..	157·2	..	387·4	247·7	84·7	87·1	45·9	226·0	172·4	135·8	68·0	65·1	..
Muzzle Energy { Perforation through Iron**	13·19	11·4	8·3	13·8	11·9	18·4	..	10·4	..	21·9	..	13·1	..	20·4	16·2	9·5	9·7	7·0	15·5	13·4	11·8	8·3	8·2	..
Muzzle Energy { Ditto by Tresidder's formula	..	..	..	..	..	18·9	..	10·5	..	24·5	..	13·9	..	20·9	15·9	9·4	10·5	..	15·1	..	..	..	..	..

Sweden.—The breech-loaders have breech screw-stoppers. The whole of the guns which do not fire shrapnel discharge case-shot.
Norway.—Besides the chilled shell, there are chilled solid shot for the 26·7-cm. and the 20·2-cm. guns, and for all muzzle-loaders case-shot also, besides steel shrapnel for some Krupp guns. * Maximum rate of increasing twist. ** By Fairbairn's formula. † The 16·7 muzzle-loading gun fires steel solid shot.

UNITED STATES NAVAL ORDNANCE.

NATURE OF GUN.	Calibre.	Weight.	Total Length.	Total Length of Bore.	Length of Rifling.	Twist of Rifling.	Length of Chamber.	Weight of Service-charge (not Smokeless Powder.)	Weight of Projectile.	Muzzle Velocity (Service). Brown Powder.	Muzzle Energy. Brown Powder.	Perforation of Wrought Iron at Muzzle.†
	inch.	tons.	feet.	inch.	inch.		inch	lbs.	lbs.	ft.-seconds.	ft.-tons.	inch.
4-in. Q.-F., Mark I.	4	1·5	13·7	157·3	130·3	zero to 1 in 25	24·7	12 to 14	33	2000	915	9·8
4-in. Q.-F. Gun	4	1·5	13·7	157·5	128·1	..	25·4	..	33	2000	..	9·8
5-in. Q.-F., Mark I.	5	2·8	13·5	150·3	120·8	1 in 180 to 1 in 30	27·1	26 to 29	60	2000	1,660	11·8
5-in. Q.-F. Gun	5	3·1	17·4	191·5	164·4	zero to 1 in 25	32·0	28 to 30	50	2300	1,834	13·2
6-in. B.L.R., Mark I.	6	4·8	15·8	176·0	136·7	1 in 180 to 1 in 30	36·9	50	100	2000	2,773	..
6-in. B.L.R., Mark II.	6	4·9	16·1	180·1	144·9	..	32·7	45 to 48	100	2000	..	13·8
6-in. B.L.R., Mark III., of 30 Cals.	6	4·8	16·3	183·8	147·3	zero to 1 in 25	34·0	44 to 47	100	2000	..	..
6-in. B.L.R., Mark III., of 35 Cals.	6	5·2	18·8	213·8	177·3	..	34·0	..	100	2080	2,990	14·7
6-in. B.L.R., Mark III., of 40 Cals.	6	6·0	21·3	243·8	207·3	..	34·0	..	100	2150	3,204	15·4
6-in. Q.-F. Gun	6	6·0	21·3	243·8	204·3	..	37·0	44 to 47	100	2150	3,200	15·4
8-in. B.L.R., Mark I.	8	12·3 12·9	21·5	239·9	195·2	1 in 180 to 1 in 30	42·1	105 to 115	250	2000	6,932	19·0
8-in. B.L.R., Mark II.	8	13·0	21·5	239·9	195·2	..	42·1	..	250	2000	..	19·0
8-in. B.L.R., Mark III., of 35 Cals.	8	13·1	25·4	290·5	242·8	zero to 1 in 25	45·1	..	250	2080	7,498	20·1
8-in. B.L.R., Mark III., of 40 Cals.	8	15·2	28·7	330·5	282·8	..	45·1	..	250	2150	8,011	21·1
10-in. B.L.R., Mark I., of 30 Cals.	10	25·7	27·4	306·3	247·3	1 in 180 to 1 in 35	57·2	225 to 240	500	2000	13,864	24·0
10-in. B.L.R., Mark I., of 35 Cals.	10	27·1 28·2	30·5	343·8	283·7	zero to 1 in 25	57·2	..	500	2060	14,709	25·0
10-in. B.L.R., Mark II., of 30 Cals.	10	25·1	27·4	307·3	247·3	zero to 1 in 26·8	57·2	..	500	2000	13,864	24·0
10-in. B.L.R., Mark II., of 35 Cals.	10	27·6	31·2	354·9	294·9	zero to 1 in 25	57·2	..	500	2100	15,285	25·8
12-in. B.L.R., Mark I.	12	45·2	36·8	419·2	343·1	..	74·1	425	850	2100	25,985	30·8
13-in. B.L.R., Mark I.	13	60·5	40·0	454·5	370·5	..	80·9	550	1100	2100	33,627	33·5

NOTE.—The weight of fixed ammunition for Q.F. 4-in. and 5-in. guns is 58 and 95 lbs. respectively.

† By Tresidder's formula.

ELSWICK QUICK-FIRING GUNS.

This Table is supplied by the Manufacturers.

	*	*	*	*		*		*	* Field and Naval.	* Field and Naval	*	*	*	*	*	*	*	*
Diameter of Bore, ins.	1·46	1·46	1·46	1·85		2·244		2·244	3·0	3·0	3·0	3·5	4	4	4	4·7	4·7	4·7
do. do. m.m.	37	37	37	47		57		57	76·2	76·2	76·2	88·9	100	100	100	120	120	120
Length of Bore, cals.	20	25	45	40		40		50	23	28	40	40	40	40	48·7	40	43·9	48·9
do. Gun, cals.	22·7	27·8	46·7	43·6		43·6		53·6	24	29·2	41·2	41·3	41·3	41·3	50	41·1	45	50
Weight of Gun	lbs. 73	lbs. 79	lbs. 268	lbs. 506		lbs. 800		cwt. 10	cwt. 5	cwt. 7·5	cwt. 12·0	cwt. 24	cwt. 32	cwt 32	cwt. 36	cwt. 42	cwt. 53	cwt. 55
do. Projectile, lbs.	1·1	1.1	1·5	3·3		6		6	12·5	12·5	12·5	20	25	30	27·5	45	45	45
do. Battering Charge	ozs. 1·125	ozs. 1·125	ozs. 4·5	ozs. 6·375	ozs. 7·94	ozs. 7·75	ozs. 9·2	...	ozs. 13·62	ozs. 13·5	lbs. 1·94	lbs. 3·75	lbs. 4·8	lbs. 4·8	lbs. 4·8	lbs. 5·5	lbs. 8·15	lbs. 8.15
Muzzle Velocity, f.-s.	1319	1540	2300	1873	2132	1820	1968	2592	1550	1585	2210	2420	2540	2325	2500	2150	2570	2600
Velocity at 2,500 yards, f.-s.	517	552	831	874	931	932	970	1166	876	898	1075	1280	1316	1328	1366	1278	1530	1558
Muzzle Energy, f.-t.	13·3	18·1	55·0	80·3	104	137·8	161	279·5	208·2	217·8	423·3	812·2	1118	1124	1192	1442	2061	2109
Energy at 2,500 Yards, f.-t.	...	...	...	17·5	19·8	36·1	39·2	56·6	66·5	69·9	100·2	227·2	300	367	356	510	730	757
Penetration at Muzzle, ins.	1·5	1·9	4·3	4·3	5·2	5·0	5·6	8·6	4·8	4·9	8·1	10·9	11·8	11·8	12·3	11·6	15·3	15·6
Perforation by Tresidder's formula, ins. ...	1·5	1·8	...	4·2	5·0	5·5	5·8	8·8	4·7	4·9	8·1	10·8	12·2	11·6	12·4	11·7	15·3	15·6
Rounds per Minute, Guns should be capable of	...	...	25	30	30	25	25	25	20	20	20	15	15	15	15	10	10	10

	*	*	*	*	*	*		*		*	*		*	‡
Diameter of Bore, ins.	6	6	6	6	8	8		8		9·4	10		12	12
do. do. m.m.	152	152	152	152	203	203		203		240	254		305	305
Length of Bore, cals.	40	40	45	50	40	40		45		40	40		40	40
do. Gun, cals.	41·54	41·54	46·54	51·54	41·63	41·63		46·7		41·8	41·64		41·7	41·7
Weight of Gun	tons. 6·6	tons. 6·6	tons. 7	tons. 7·6	tons. 15·5	tons. 16 5		tons. 18·5		tons. 26·3	tons. 30		tons. 48 9	tons. 50
do. Projectile, lbs.	100	100	100	100	210	210	250	210	250	352	450	500	850	850
do. Battering Charge	lbs. 15	lbs. 18·3	lbs. 18·3	lbs. 18·3	lbs. 32	lbs. 44		lbs. 44		lbs. 67·25	lbs. 81·5		lbs. 141	lbs. 205
Muzzle Velocity, f.-s.	2200	2500	2570	2600	2250	2775	2440	2650	2480	2500	2400	2300	2400	2625
Velocity at 2,500 yards, f.-s.	1509	1709	1759	1790	1631	1883	1893	1918	1886	1936	1909	1893	2011	1903
Muzzle Energy, f.-t.	3356	4334	4580	4687	7372	9655	10321	10226	10662	15255	17973	18341	33349	40631
Energy at 2,500 Yards, f.-t.	1579	2025	2145	2224	3873	5163	6212	5367	6166	9148	11371	12424	23836	21345
Penetration at Muzzle, ins.	16·1	19 5	20·4	20·7	20·3	24·9	26·0	26·0	26·8	28·4	29·9	30·4	38·4	43·5
Perforation by Tresidder's formula, ins.	16·0	19·4	20·1	20·6	20·3	25·2	25·5	26·5	26·2	29·0	29·9	29·6	37·5	42·5
Rounds per Minute, Guns should be capable of	7	7	7	7	4	4	3	4	3	2	2	2	...	...

Guns from 3 to 6 inches can be fitted with either a metallic cartridge case or modified De Bange pad.

* Existing or service guns. ‡ This 12-in. gun is not yet completed, but the specification governing manufacture provides for the results given.

Velocities of 2813 and 2600 f.-s. are obtained with the 210 and 250 lb. projectiles, respectively, with Battering charges. With special charges and suitable cordite a velocity of 2940 f.-s. has been obtained with 100 lb. projectiles. This high velocity, however, is not desirable, except on very rare occasions, on account of the excessive wear of the gun.

Some Results Actually Obtained.

4·7-in. 42 cwt. gun, with single motion breech mechanism, 5 rounds in 22 seconds, at Silloth, at a target, 2 hits, range 1,000 yards; 7 rounds in 25 seconds at drill.

6-in. Admiralty gun, with three-motion breech mechanism and E.X.E. powder, 10 rounds in 85 seconds, at sea, on board gunboat Kite; 18 rounds in 3 minutes, H.M.S. Royal Arthur, 14 hits on target, ship steaming 8 knots, range from 1,600 to 2,200 yards; 18 rounds in 3 minutes, H.M.S. Blake, 15 hits on target, ship steaming 8 knots, range from 1,600 to 2,200 yards. Total number of rounds fired from 10 guns in same time 148, of which 110 hit the target.

6-in. 6·6-ton gun, with single motion breech mechanism, 7 rounds in 61 seconds, at Silloth, cordite charge; 4 rounds in 20 seconds, at drill.

8-in. 15·5-ton gun, with single motion breech mechanism, 3 rounds in 28 seconds at drill; 4 rounds in 62 seconds, on board cruiser Blanco Encalada, ammunition supplied from magazine.

13·5-in. 68-ton B.L. gun, with hydraulic breech mechanism, 7 rounds in 12 minutes, H.M.S. Royal Sovereign, 6 hits on target, ship steaming 8 knots, range from 1,600 to 2,200 yards; 4 rounds in 6 minutes, H.M.S. Empress of India, with an interval between rounds of only 1 minute 27 seconds.

12-in. 46-ton B.L. gun, interval between 2 rounds, 1 minute 19 seconds, H.M.S. Majestic; 1 minute 4 seconds, H.M.S. Cæsar.

12-in. gun, interval between 2 rounds, 49 seconds, H.M.S. Illustrious; 6 rounds were fired from one turret in 1 minute 47 seconds.

Q.F. GUNS AND MOUNTINGS.

This Table is supplied by the Manufacturers.

—	* 37 m.m. 30 cal.	* 37 m.m. 42·5 cal.	* 47 m.m. 40 cal.	* 47 m.m. 47·2 cal.	* 57 m.m. 42·3 cal.	* 57 m.m. 50 cal.	* Naval. 76·2 m.m. 45 cal.	* Naval. 76·2 m.m. 50 cal.	* Field. 76·2 m.m. 23·5 cal.	* Moun-tain. 75 m.m. 10·7 cal.
Gun.										
Diameter of Bore (in ins.)	1·457	1·457	1·85	1·85	2·244	2·244	3	3	3	2·953
Length of Bore (in ins.)	43·5	62·0	73·72	87·34	95	112·2	135	150	70·5	31·6
Total length of Gun (in ins.)	73·75	94·0	77·95	91·5	104·4	116·4	138	153	75·55	35·85
Diameter of Chamber	1·44	1·6	2·04	2·04	2·45	2·8	3·5	3·5	3·4	3·0
Length of Chamber	2·64	3·78	12·93	12·93	10·2	14·2	19	19	9·6	4·575
Maximum pressure in Chamber	13 tons	14 tons	13 tons	13 tons	15 tons	15 tons	16 tons	16 tons	14 tons	8 tons
Nature of Charge	Cordite	Cordite	Cordite	Cordite	Cordite	Cordite	Cordite	Cordite	Cordite	Cordite
Weight of Charge	oz. grs. 1 110	oz. grs. 3 0	oz. 9	oz. 11	oz. 15	lb. oz. 1 4	lb. oz. 2 9	lb. oz. 2 9	lb. 1	ozs. 6·25
Weight of Projectile	1 lb.	1·25 lbs.	3·3 lbs.	3·3 lbs.	6 lbs.	6 lbs.	12·5 lbs.	12·5 lbs.	12·5 lbs.	12·5 lbs.
Total weight of Gun, including Breech Mechanism	c. q. l. 4 0 22	c. q. l. 5 1 26	c. q. l. 4 0 0	c. q. l. 4 2 6	c. q. l. 6 2 0	c. q. l. 8 0 0	c. q. l. 14 2 14	c. q. l. 15 3 0	c. q. l. 5 2 23	c. q. l. 2 0 13
Muzzle Velocity in feet per second	1800	2350	2125	2400	2300	2500	2600	2700	1700	918
Muzzle Energy in foot tons	22·5	48	103	132	220	260	586	632	250·4	73
Penetration of Wrought Iron Plate at Muzzle by Gavre's formula	1·9	3·3	4·5	5·3	6·2	7	9·2	9·7	..	..
Penetration of Steel Plate at Muzzle by Gavre's formula	1·5	2·6	3·5	4·1	4·8	5·4	7·1	7·5	..	..
†Perforation of Wrought Iron at Muzzle (Tresidder's formula)	..	..	..	..	7·1	7·9	10·25	10·8	5·4	..
Rounds per minute	300	300	30	30	28	28	20	20	20	14
Mounting.										
Weight of Mounting complete with Shield	c. q. l. 3 0 22	c. q. l. 3 2 5	c. q. l. 9 3 0	c. q. l. 10 0 18	c. q. l. 12 2 0	c. q. l. 12 0 0	t. c. q. l. 2 11 0 0	t. c. q. l. 2 13 0 0	Carriage and limber with accessories and 40 rounds of ammunition.	c. q. l. 5 3 5
Thickness of Shield (in ins.)	¼	no shield	¼	¼	3/16	¼	2	2		no shield
Weight of Shield	c. q. l. 0 3 11	..	c. q. l. 1 3 0	c. q. l. 1 3 0	c. q. l. 1 0 0	c. q. l. 1 3 9	t. c. q. l. 1 12 0 0	t. c. q. l. 1 12 0 0	t. c. q. l. 1 4 0 0	..
Angle of Elevation	16°	13°	18°	18°	20°	20°	20°	20°	17°	26°
Angle of Depression	25°	25°	15°	12°	20°	15°	10°	10°	5°	10°

—	* 101·6 m.m. 45 cal.	* 101·6 m.m. 50 cal.	* 12 c.m. 40 cal.	* 12 c.m. 45 cal.	* 15·24 c.m. 40 cal.	* 15·24 c.m. 45 cal.	‡ 20·3 c.m. 45 cal.	‡ 23·36 c.m. 45 cal.	‡ 25·4 c.m. 42 cal.	‡ 30·48 c.m. 40 cal.
Gun.										
Diameter of Bore (in ins.)	4	4	4·724	4·724	6	6	8	9·2	10	12
Length of Bore (in ins.)	180	200	188·98	212·58	240	270	360	414	405·15	480
Total length of Gun (in ins.)	186·1	206	193·28	217	249·2	279·2	371·7	426·8	120	496·5
Diameter of Chamber	5	5	5·1	5·5	6·8	8·5	10	135	115	175
Length of Chamber	21·2	21·2	25·5	25·75	32·5	33	43	67	63·35	872
Maximum pressure in Chamber	17 tons	17 tons	16 tons	17 tons	16 tons	17 tons	17 tons	17 tons	17 tons	17 tons
Nature of Charge	Cordite	Cordite	Cordite	Cordite	Cordite	Cordite	Cordite	Cordite	Cordite	Cordite
Weight of Charge	lbs. 6	lbs. 6	lbs. 8·5	lbs. 9	lbs. 19	lbs. 25	lbs. 52	lbs. 94·5	lbs. 100	lbs. 207
Weight of Projectile	25 lbs.	25 lbs.	45 lbs.	45 lbs.	100 lbs.	100 lbs.	210 lbs.	380 lbs.	450 lbs.	850 lbs.
Total weight of Gun, including Breech Mechanism	t. c. q. l. 1 13 0 0	t. c. q. l. 1 16 0 0	t. c. q. l. 2 10 0 0	t. c. q. l. 2 14 0 0	t. c. q. l. 5 15 0 0	t. c. q. l. 7 8 0 0	t. c. q. l. 18 16 2 0	t. c. q. l. 26 16 0 0	t. c. q. l. 28 4 0 0	t. c. q. l. 50 7 0 0
Muzzle Velocity in feet per second	2700	2800	2494	2600	2530	2775	2750	2750	2580	2750
Muzzle Energy in foot tons	1263	1359	1940	2109	4437	5340	11012	19927	20811	44573
Penetration of Wrought Iron Plate at Muzzle by Gavre's formula	11·6	12·3	13·3	14·1	18·5	21·1	26·0	31·3	32·3	45·9
Penetration of Steel Plate at Muzzle by Gavre's formula	9	9·5	10·3	10·9	14·4	16·4	20·2	26·6	25·0	35·5
†Perforation of Wrought Iron at Muzzle (Tresidder's formula)	13·3	14·0	14·6	15·5	19·8	22·6	28·0	32·7	33·4	45·9
Rounds per minute	15	15	12	12	8	8	5	..	..	..
Mounting.										
Weight of Mounting complete with Shield	t. c. q. l. 4 4 3 0	t. c. q. l. 4 10 0 0	t. c. q. l. 5 17 0 0	t. c. q. l. 6 5 0 0	t. c. q. l. 8 15 0 0	t. c. q. l. 9 5 0 0	t. c. q. l. 16 8 0 0	Depending on type of mounting used.		
Thickness of Shield (in ins.)	4	4	4	4	4	4	4			
Weight of Shield	t. c. q. l. 2 6 0 0	t. c. q. l. 2 6 0 0	t. c. q. l. 3 18 0 0	t. c. q. l. 3 18 0 0	t. c. q. l. 4 0 0 0	t. c. q. l. 4 0 0 0	t. c. q. l. 7 0 0 0			
Angle of Elevation	20°	20°	20°	20°	16°	16°	15°			
Angle of Depression	7°	7°	7°	7°	7°	7°	5°			

Older types of 9·2-in., 10-in., 12-in. and 13·5-in. guns, as manufactured by Vickers, Sons & Maxim, Limited, are not enumerated in the table, but only modern guns making use of smokeless powders.

* Existing guns. † The perforations through wrought iron (Tresidder's) are added by the compiler for purposes of comparison. ‡ Under manufacture.

SCHNEIDER - CANET QUICK - FIRE GUNS. Model 1898.

Existing guns, or guns which differ very little from such as have been constructed, are denoted by an asterisk.

This Table is supplied by the Manufacturers.

Calibre, in centimètres	24			21			16			*15			14			12			
Calibre, in inches	9·45			8·27			6·30			5·91			5·51			4·72			
Length, in calibres	40	45	50	40	45	50	*45	50	60	*45	50	60	*45	50	60	*45	*50	60	80
Length, in feet	31·5	35·4	39·4	27·6	31·0	34·4	23·6	26·2	31·5	22·2	24·6	29·5	20·7	23·0	27·6	17·7	19·7	23·6	31·5
Weight of Gun, in tons	20·7	22·5	26·1	13·9	15·1	17·5	7·28	7·73	8·56	5·71	6·10	7·09	4·82	5·17	5·76	2·85	3·15	3·64	6·15
Weight of Projectile, in lbs.	330·7			242·5			101·4			88·2			70·5			46·3			
Muzzle Velocity, in ft.-secs.	2493	2625	2756	2493	2625	2756	2625	2756	2953	2625	2756	2953	2625	2756	2953	2625	2756	2953	3281
Velocity at 2000 mètres, in ft.-secs.	1969	2074	2182	1900	2001	2106	1867	1956	2103	1860	1955	2093	1818	1913	2047	1719	1811	1939	2152
Muzzle Energy, in ft.-tons	14258	15799	17418	9506	10533	11621	4846	5341	6132	4211	4645	5332	3371	3716	4265	2212	2439	2799	3455
Energy at 2000 mètres, in ft.-tons	8887	9860	10917	5517	6141	6783	2451	2716	3111	2116	2339	2679	1616	1790	2051	949	1054	1204	1487
Perforation at muzzle, in ins.†	30·3	33·8	35·4	26·0	28·1	30·2	21·1	22·8	25·3	20·4	22·0	24·5	18·7	20·1	22·3	16·1	17·4	19·3	22·6
" " " ‡	27·9	30·0	32·3	25·5	27·5	29·7	20·5	22·2	24·5	19·7	21·2	23·6	18·2	19·5	21·3	15·9	17·1	19·1	22·4
Perforation at 2000 mètres, in ins.†	21·1	22·8	24·7	17·4	18·5	20·0	12·5	13·5	15·0	12·0	13·0	14·2	10 6	11·5	12·7	8·4	9·1	10·1	11·9

Calibre, in centimètres	10				9			75 mm.			*65			57			47			37		
Calibre, in inches	3·94				3·50			3·03			2·57			2·24			1·85			1·46		
Length, in calibres	*45	*50	*60	*80	50	60	80	*50	60	80	*60	70	80	*60	70	*80	50	60	70	50	60	70
Length, in feet	14·8	16·4	19·7	26·2	14·8	17·7	23·6	12·3	14·8	19·7	12·8	14·9	17·1	11·2	13·1	15·0	..	..	..	..	..	..
Weight of Gun, in tons	1·77	1·89	2·12	3·54	1·38	1·57	2·56	0·79	0·89	1·53	0·64	0·79	0·94	0·59	0·69	0·79	0·24	0·27	0·35	0·13	0·15	0·18
Weight of Projectile, in lbs.	28·7				22·0			13·2			8·82			6·0			3·3			1·8		
Muzzle Velocity, in ft.-secs.	2625	2723	2920	3215	2690	2887	3182	2658	2854	3150	2658	2854	3150	2625	2822	3117	2329	2559	2723	2297	2493	2690
Velocity at 2000 mètres, in ft.-secs.	1640	1703	1831	2011	1640	1755	1939	1496	1668	1775	1394	1496	1650	1033	1083	1171	1017	1086	1129	945	984	1017
Muzzle Energy, in ft.-tons	1369	1474	1696	2055	1107	1275	1549	648	748	910	432	498	607	284	329	401	111	150	178	64	76	88
Energy at 2000 mètres, in ft.-tons	525	576	666	804	411	471	574	205	237	289	119	137	167	44	48	57	24	27	29	11	12	13
Perforation at muzzle, in ins.†	13·7	14·9	16·1	18·7	13·2	14·7	17·1	10·8	12·0	14·0	9·3	10·4	12·1	7·8	8·8	10·2	5·2	5·5	5·7	4·1	4·7	5·3
" " " ‡	13·7	14·5	16·1	18·6	13·4	14·8	17·3	10·9	12·2	14·0	9·6	10·7	12·4	8·3	9·3	10·8	5·7	6·6	7·2	4·6	5·2	5·9
Perforation at 2000 mètres, in ins.†	6·7	7·0	7·9	9·1	5·7	6·8	8·0	4·4	5·0	5·8	3·4	3·9	4·4	1 9	2·0	2·3	1·5	1·6	1·7	1·1	1·1	1·2

† Through wrought iron, apparently calculated by De Marre's formula. ‡ Through wrought iron, by Tresidder's formula.

* The compiler is responsible for the conversion of figures supplied into British units, and for the calculation of the perforations through wrought iron on Krupp's system.

KRUPP QUICK-FIRE GUNS.

Quick-Fire Guns of 40 and 50 calibres in length.

Table supplied by Manufacturers.

LIGHT GUNS.

Calibre, in centimètres	12		13		14		15		16		17		19		21		24		28		30·5	
Calibre, in inches	4·72		5·12		5·51		5·87		6·30		6·79		7·48		8·24		9·45		11·02		12·01	
Total Length, in feet	*15·75	19·69	17·06	21·33	18·37	22·97	*19·55	24·44	21·00	26·25	22·64	28·31	24·94	31·17	*27·56	34·45	*31·50	39·37	36·75	45·93	40·03	50·03
Length of Bore, in inches	175·20	222·45	190·16	241·34	204·73	259·85	218·12	276·78	233·86	296·85	251·97	320·09	277·57	352·37	305·91	388·59	350·80	445·28	409·46	519·70	445·67	565·76
Length of Gun, in calibres	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50
Weight of Piece, in lbs.	6107	7937	7760	10075	9700	12610	11707	15212	14462	18783	18188	23589	24251	31526	32294	41888	48722	63273	77603	100753	100312	130070
Weight of Piece, in tons	2·73	3·54	3·47	4·50	4·33	5·63	5·23	6·79	6·46	8·39	8·12	10·53	10·83	14·08	14·42	18·70	21·75	28·25	34·65	44·98	44·78	58·07
Weight of Steel Projectile, in lbs.	46·3	46·3	59·5	59·5	75·0	75·0	90·4	90·4	112·4	112·4	141·1	141·1	187·4	187·4	249·1	249·1	374·8	374·8	595·2	595·2	771·6	771·6
	59·5	59·5	75·0	75·0	94·8	94·8	112·4	112·4	141·1	141·1	176·4	176·4	235·9	235·9	308·6	308·6	474·0	474·0	760·6	760·6	981	981
Weight of Charge, in lbs.	11·22	14·88	14·26	18·96	17·86	23·59	21.61	28·66	26·68	35·27	33·51	44·31	44·53	59·08	59·30	78·70	85·98	114·42	142·64	189·6	184·1	244·7
Muzzle Velocity, in ft.-secs.	2569	2956	2543	2927	2546	2933	2526	2907	2539	2920	2536	2920	2533	2927	2566	2969	2592	2995	2602	3012	2598	3005
	2267	2608	2267	2608	2267	2608	2267	2608	2267	2608	2267	2608	2267	2608	2303	2664	2303	2664	2303	2664	2303	2664
Muzzle Energy, in foot-tons	2121	2807	2674	3539	3380	4473	4007	5303	5030	6656	6288	8322	8409	11128	11353	15192	17439	23334	27985	37443	36090	48290
Perforation through Steel,† in ins.	10·95	13·4	11·85	14·5	12·95	15·8	13·7	16·7	14·9	18·2	16·1	19·7	17·9	21·9	20·0	24·6	23·5	28·9	27·9	34·3	30·5	37·6
Perforation through Iron, Tresidder's formula	15·5	19·4	..	..	..	..	19·5	23·9	..	..	..	..	..	..	27·1	33·6	31·6	39·1	..	..	..	..
	14·5	18·0	..	..	..	..	17·0	21·0	..	..	..	..	..	..	25·6	31·8	29·9	37·0	..	..	..	..

HEAVY GUNS.

Calibre, in centimètres	12		13		14		15		16		17		19		21		24		28		30·5	
Calibre, in inches	4·72		5·12		5·51		5·87		6·30		6·79		7·48		8·24		9·45		11·02		12·01	
Total Length, in feet	15·75	19·69	17·06	21·33	18·37	22·97	19·55	24·44	21·00	26·25	22·64	28·31	24·94	31·17	27·56	34·45	*31·50	39·37	*36·75	45·93	*40·03	50·03
Length of Bore, in inches	175·20	222·45	190·16	241·34	204·73	259·85	218·12	276·78	233·86	296·86	251·97	320·09	277·57	352·37	305·91	388·59	350·80	445·28	409·46	519·70	445·67	565·76
Length of Gun, in calibres	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50
Weight of Piece, in lbs.	7628	9524	9700	12125	12125	15146	14639	18298	18078	22597	22708	28440	30203	37920	40345	50486	58642	73193	97000	121250	125224	156530
Weight of Piece, in tons	3·41	4·25	4·33	5·41	5·41	6·76	6·54	8·17	8·07	10·09	10·14	12·70	13·48	16·93	18·01	22·54	26·18	32·68	43·31	54·13	55·9	69·9
Weight of Steel Projectile, in lbs.	46·3	46·3	59·5	59·5	75·0	75·0	90·4	90·4	112·4	112·4	141·1	141·1	187·4	187·4	249·1	249·1	374·8	374·8	595·2	595·2	771·6	771·6
	59·5	59·5	75·0	75·0	94·8	94·8	112·4	112·4	141·1	141·1	176·4	176·4	235·9	235·9	308·6	308·6	474·0	474·0	760·6	760·6	981·0	981·0
Weight of Charge, in lbs.	11·86	15·54	15·06	19·75	18·85	24·69	22·71	29·76	28·22	36·82	35·27	46·08	46·96	61·51	62·83	82·23	94·36	119·27	151·02	197·31	194·7	255·7
Muzzle Velocity, in ft.-secs.	2710	3104	2684	3071	2690	3084	2667	3051	2677	3071	2674	3064	2684	3078	2664	3051	2687	3084	2707	3100	2697	3087
	2392	2740	2392	2740	2392	2740	2392	2740	2392	2740	2392	2740	2392	2740	2392	2740	2392	2740	2392	2740	2392	2740
Muzzle Energy, in foot-tons	2361	3099	2977	3906	3763	4937	4461	5853	5600	7348	7000	9186	9362	12285	12246	16070	18812	24685	30191	39611	38935	51090
Perforation through Steel,† in ins.	11·8	14·3	12·8	15·55	14·0	17·0	14·75	17·9	16·1	19·5	17·4	21·1	19·3	23·5	21·1	25·6	24·8	30·1	29·4	35·7	32·2	39·1
Perforation through Iron, Tresidder's formula	16·8	20·7	17·9	22·0	19·5	24·9	21·0	25·8	22·2	27·2	23·9	29·3	26·3	32·5	28·6	35·1	34·2	40·9	39·1	48·0	42·4	52·1
	15·8	19·3	16·9	20·6	18·3	22·4	19·5	24·0	20·9	25·6	22·4	27·5	24·9	30·9	27·1	33·1	31·4	38·4	36·9	45·1	40·0	49·1

* Existing service-guns. † Of medium hardness.

KRUPP QUICK-FIRE GUNS.

Quick-Fire Guns of 40 and 50 calibres in length.

Tables supplied by Manufacturers.

Calibre, in centimètres	3·7		4		4·7		5		5·3		5·7		6	
Calibre, in inches	1·46		1·57		1·85		1·97		2·09		2·24		2·36	
Total Length, in feet	4·86	6·07	*5·25	6·56	*6·17	7·71	*6·56	*8·20	*6·95	8·69	*7.48	9·35	*7·87	*9·84
Length of Bore, in inches	53·15	67·72	57·48	73·23	67·72	86·22	71·85	91·54	76·18	97·05	81·89	104·33	86·22	109·84
Length of Gun, in calibres	40	50	40	50	40	50	40	50	40	50	40	50	40	50
Weight of Piece, in lbs.	224·87	277·78	282·19	352·74	458·56	573·2	551·2	687·8	654·8	820·1	815·7	1018·5	952·4	1190·5
Weight of Piece, in tons	..	..	..	..	..	..	..	..	..	..	0·36	0·45	0·43	0·53
Weight of Steel Projectile, in lbs.	1·39		1·74		2·82		3·40		4·06		5·05		5·89	
Weight of Charge, in lbs.	0·287	0·397	0·364	0.474	0·595	0·761	0·716	0·915	0·849	1·09	1·06	1·37	1·235	1·59
Muzzle Velocity, in ft.-secs.	2444	2805	2444	2805	2444	2805	2444	2805	2444	2805	2444	2805	2444	2805
Muzzle Energy, in foot-tons	57·6	75·8	72·0	94·9	116·7	153·9	140·7	185·5	168·0	221·5	209	276	244	321
Perforation through Steel,† in ins.	3·94	3·58	3·18	3·87	3·77	4·59	4·03	4·90	4·30	5·24	4·65	5·66	4·91	5·97
Perforation through Iron, Tresidder's formula	..	..	..	..	..	..	..	..	5·6	8·0	5·9	8·5	6·2	8·8

Calibre, in centimetres	7		7·5		8		8·4		8·7		9		10·5	
Calibre, in inches	2·76		2·95		3·15		3·31		3·43		3·54		4·13	
Total Length, in feet	*9·19	11·48	*9·84	12·30	10·50	13·12	*11·02	13·78	*11·42	*14·27	11·81	14·76	*13·78	17·22
Length of Bore, in inches	100·59	128·16	107·68	137·21	114·96	146·46	120·67	153·75	125·00	159·26	129·34	164·77	153·55	194·89
Length of Gun, in calibres	40	50	40	50	40	50	40	50	40	50	40	50	40	50
Weight of Piece, in lbs.	1516·80	1896·0	1873·9	2336·9	2248.7	2821·9	2601.4	3262·8	2910·2	3615·6	3218·7	4012·4	5114·7	6393·4
Weight of Piece, in tons	0·68	0·85	0·84	1·04	1·00	1·26	1·16	1·46	1·30	1·61	1·44	1·79	2·28	2·85
Weight of Steel Projectile, in lbs.	9·35		11·49		13·93		16·14		17·92		19·84		{30·9 {39·7	30·9 39·7
Weight of Charge, in lbs.	1·96	2·54	4·40	3·09	2·91	3·75	3·40	4·37	3·75	4·85	4·14	5·36	7·94	10·41
Muzzle Velocity, in ft.-secs.	2444	2805	2444	2805	2444	2805	2444	2805	2444	2805	2444	2805	{2658 {2349	3035 2684
Muzzle Energy, in foot-tons	387	510	476	627	577	760	668	881	742	978	822	1083	1519	1984
Perforation through Steel,† in ins.	5·79	7·05	6·23	7·59	6.67	8·13	7·04	8·57	7·31	8·90	7·57	9·22	9·96	12·0
Perforation through Iron, Tresidder's formula	7 3	10·4	7·8	11·1	8·3	11·8	8·7	12·3	8·8	12·6	9·3	13·3	{14·2 {18·3	17·2 16·3

* Existing service-guns.

† Of medium hardness.

Table Relating to Conversion of Measures.

Length.

Metric to English. — English to Metric.

I. Mètres.	II. Yards.	III. Feet.	IV. Inches.	V. Yards.	VI. Mètres.	VII. Feet.	VIII. Mètres.	IX. Inches.	X. Centimètres.
1	1·0936	3·2809	39·37	1	0·91438	1	0·30479	1	2·5400
2	2·1873	6·5618	78·74	2	1·82877	2	0·60959	2	5·0799
3	3·2809	9·8427	118·11	3	2·74315	3	0·91438	3	7·6199
4	4·3745	13·1236	157·48	4	3·65753	4	1·21918	4	10·1598
5	5·4682	16·4045	196·85	5	4·57192	5	1·52397	5	12·6998
6	6·5618	19·6854	236·22	6	5·48630	6	1·82877	6	15·2397
7	7·6554	22·9663	275·60	7	6·40068	7	2·13356	7	17·7797
8	8·7491	26·2472	314·97	8	7·31507	8	2·43836	8	20·3196
9	9·8427	29·5281	354·34	9	8·22945	9	2·74315	9	22·8596

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of yards in 2354 mètres (see cols. I. & II.).	of feet in 12·4 mètres (see cols. I. & III.).	of inches in 30·5 centimètres (see cols. I. & IV.). Note, 1 m.=100 cm.	of mètres in 1026 yards (see cols. V. & VI.).	of mètres in 1742 feet (see cols. VII. & VIII.).	of centimètres in 17·72 ins. (see cols. IX. & X.)
mètres. yards. 2000=2187·3 300= 328·09 50= 54·68 4= 4·37	mètres. feet. 10 =32·809 2 = 6·562 0·4= 1·312	cms. inches. 30·0=11·811 ·5= ·197	yards. mètres. 1000=914·38 20= 18·29 6= 5·49	feet. mètres. 1000=304·79 700=213·36 40= 12·19 2= 0·61	inches. cms. 10·0 =25·400 7·0 =17·780 0·7 = 1·778 ·02= ·051
∴ 2354=2574·44	∴ 12·4=40·683	∴ 30·5=12·008	∴ 1026=938·16	∴ 1742=530·95	∴ 17·72=45·009

Note.—A ready way of approximately converting all French measures into English inches is to multiply by 4 and apply the decimal point by common sense—Thus for a 15-cm. gun; 15 × 4 = 60. Now this Calibre cannot be 60 inches, nor can it be 0·6 inch; therefore it must be 6 inches. (The exact value is 5·906 in.)

Weight.

Metric to English. — English to Metric.

I. Kilo-grammes.	II. Tons.	III. Pounds Avoirdupois.	IV. Grains Troy.	V. Tons.	VI. Milliers.	VII. Pounds Avoir-dupois.	VIII. Kilo-grammes.	IX. Grains. Troy.	X. Gramme.
1	·000984	2·2046	15432·3	1	1·016	1	0·4536	1	·0648
2	·001968	4·4092	30864·7	2	2·032	2	0·9072	2	·1296
3	·002953	6·6139	46297·0	3	3·048	3	1·3608	3	·1944
4	·003937	8·8185	61729·4	4	4·064	4	1·8144	4	·2592
5	·004921	11·0231	77161·7	5	5·080	5	2·2680	5	·3240
6	·005905	13·2277	92594·1	6	6·096	6	2·7216	6	·3888
7	·006889	15·4323	108026·4	7	7·112	7	3·1751	7	·4536
8	·007874	17·6370	123458·8	8	8·128	8	3·6287	8	·5184
9	·008858	19·8416	138891·1	9	9·144	9	4·0823	9	·5832

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of tons in 35 milliers (see cols. I. & II. Note, 1000 kg. =1 millier).	of pounds in 56·3 kilo-grammes. (see cols. I. & III.).	of grains in 120 grammes (see cols. I. & IV. Note, 1000 grms. = 1 kg.)	of milliers in 38 tons (see cols. V. & VI.).	of kilogrammes in 68 pounds (see cols. VII. & VIII).	of grammes in 85 grains (see cols. IX. & X.).
milliers. tons. 30 = 29·53 5 = 4·92	kgrms. lbs. 50 =110·231 6 = 13·228 0·3= ·661	grammes. grains. 100=1543·23 20= 308·65	tons. milliers. 30 = 30·48 8 = 8·13	lbs. kgs. 60 = 27·216 8 = 3·629	grains. grammes. 80 = 5·184 5 = 0·324
∴ 35 = 34·45	∴ 56·3=124·120	∴ 120=1851·88	∴ 38 = 38·61	∴ 68 = 30·845	∴ 85 = 5·508

Note.—7000 grains troy=1 pound avoirdupois.

PRESSURE.

Metric to English.			English to Metric.				Atmospheric to English.		English to Atmospheric.	
I. Kilo-grammes per square centi-mètre.	II. Pounds per square inch.	III. Tons per square inch.	IV. Pounds per square inch.	V. Kilo-grammes per square centi-mètre.	VI. Tons per square inch.	VII. Kilo-grammes per square centi-mètre.	VIII. Atmo-spheres.	IX. Tons per square inch.	X. Tons per square inch.	XI. Atmo-spheres.
1	14·223	·00635	1	·07031	1	157·49	1	·00656	1	152·38
2	28·446	·01270	2	·14062	2	314·99	2	·01313	2	304·76
3	42·668	·01905	3	·21093	3	472·48	3	·01969	3	457·14
4	56·891	·02540	4	·28124	4	629·97	4	·02625	4	609·52
5	71·114	·03175	5	·35155	5	787·47	5	·03281	5	761·91
6	85·337	·03810	6	·42186	6	944·96	6	·03938	6	914·29
7	99·560	·04445	7	·49217	7	1102·45	7	·04594	7	1066·67
8	113·783	·05080	8	·56248	8	1259·95	8	·05250	8	1219·05
9	128·005	·05715	9	·63279	9	1417·44	9	·05906	9	1371·43

Note.—One atmosphere is taken to be 14·7 lbs. per square inch.

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of pounds per square inch in 32·1 kilogrammes per square centimètre (see cols. I. & II.).

kgs. per sq. cm.		lbs. per sq. in.
30	=	426·68
2	=	28·45
0·1	=	1·42
32·1	=	456·55

of tons per square inch in 3210 kilogrammes per square centimètre (see cols. I. & III.).

kgs. per sq. cm.		tons per sq. in.
3000	=	19·05
200	=	1·27
10	=	·06
∴ 3210	=	20·38

of kilogrammes per square centimètre in 15 lbs. per square inch (see cols. IV. & V.).

lbs. per sq. in.		kgs. per sq. cm.
10	=	·7031
5	=	·3516
∴ 15	=	1·0547

of kilogrammes per square centimètre in 18·3 tons per square inch (see cols. VI. & VII.).

tons per sq. in.		kgs. per sq. cm.
10	=	1574·9
8	=	1259·95
0·3	=	47·25
∴ 18·3	=	2882·10

of tons per square inch in 3254 atmospheres. (see cols. VIII. & IX.).

atmospheres.		tons per sq. inch.
3000	=	19·69
200	=	1·31
50	=	·33
4	=	·03
∴ 3254	=	21·36

of atmospheres in 14·6 tons per square inch (see cols. X. & XI.).

tons per sq. in.		atmospheres.
10	=	1523·8
4	=	609·5
0·6	=	91·4
∴ 14·6	=	222·7

ENERGY.

Metric to English.		English to Metric.	
I. Mètre-tons.	II. Foot-tons.	III. Foot-tons.	IV. Mètre-tons.
1	3·2291	1	0·3097
2	6·4581	2	0·6194
3	9·6872	3	0·9291
4	12·9162	4	1·2388
5	16·1453	5	1·5484
6	19·3743	6	1·8581
7	22·6034	7	2·1678
8	25·8324	8	2·4775
9	29·0615	9	2·7872

1 mètre-ton is termed a "dinamode" in Italy.

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus find the number

of foot-tons in 4367 mètre-tons (see cols. I. & II.).

mètre-tons.		foot-tons.
4000	=	12916·2
300	=	968·72
60	=	193·74
7	=	22·60
∴ 4367	=	14101·26

of mètre-tons in 3592 foot-tons (see cols. III. & IV.).

foot-tons.		mètre-tons.
3000	=	929·1
500	=	154·84
90	=	27·87
2	=	·62
∴ 3592	=	1112·43

PERFORATION THROUGH IRON AND STEEL WITH THE FACE NOT HARDENED.

To obtain perforation through steel equivalent to a given perforation through iron, and *vice versâ*.

1 inch steel = $1\frac{1}{4}$ inches iron ;

that is, 4 inches steel = 5 inches iron.

Thus, given 9·4 inches perforation through iron,

$$9·4 \times \frac{4}{5} = 7·52 \text{ inches steel};$$

or, given 5·2 inches steel,

$$5·2 \times \frac{5}{4} = 6·5 \text{ inches iron}.$$

PART IV.

STATISTICS, OFFICIAL STATEMENTS AND PAPERS.

Statement of the First Lord of the Admiralty explanatory of the Navy Estimates for 1899–1900.

THE Navy Estimates for 1899–1900 amount to a net total of £26,594,500, as compared with the sum of £23,778,400 voted for the year 1898–99, showing an increase of £2,816,100.

Of this increase the Votes connected with the *personnel* account for £452,600, including an increase of £55,300 in the non-effective Votes, which will now amount to £1,890,700. Various Miscellaneous Votes show an increase of £40,900. The Works Vote is higher by £145,000. The Ordnance Vote by £161,600. The Shipbuilding Vote shows an increase of £2,016,000. The liabilities included in this Vote due to the Supplemental Programme of last August amount to £2,000,000.

NUMBERS.

The total number of officers, seamen and boys, coastguard, and Royal Marines voted for the year 1898–99 was 106,390, being an increase on the previous year of 6,340.

On the 1st February the number borne was 105,280, leaving only 1,110 to be entered during the months of February and March. There is no reason to doubt that the total number voted will be reached by the end of the financial year.

A force of 110,640 is proposed for 1899–1900, being an increase of 4,250. The additions proposed are to meet the larger requirements of the Fleet, and are composed of:—

463	Officers.
1,700	Petty Officers and Seamen.
215	Engine-room Artificers and Artisans.
1,000	Stokers.
172	Miscellaneous.
500	Marines.
200	Boys under training.
4,250	

The increases in the numbers voted during the last few years entail a corresponding increase in the number of men in the gunnery and torpedo schools. Additional accommodation has, therefore, become necessary at Whale Island, for which provision has been made in the Estimates.

In order to make better provision for the accommodation and training of the second-class stokers waiting draft in the Depôt at Chatham, the Northumberland has been commissioned experimentally as tender to the Pembroke.

The following increases in the several lists of officers have been rendered necessary by the continued expansion of the Fleet:—

Flag Officers	from 68 to 80
Captains	from 208 to 245
Commanders	from 304 to 360
Lieutenants	from 1,150 to 1,550

These additions will be effected gradually over a certain number of years.

The number of engineer officers is to be raised from 950 to 1,050; the increase to be spread over two years.

Medical officers are to be raised from 450 to 490, gradually.

Chaplains from 59 to 69.

Chaplains and Naval Instructors from 50 to 60.

Naval Instructors from 35 to 41.

Chief Gunners
Chief Boatswains } to be increased from 80 to 100.

Gunners
Boatswains } from 920 to 1,150.

Chief Carpenters from 18 to 20.

Carpenters from 207 to 240.

Steps are being taken to effect a great simplification in the rules governing sea and harbour time of officers, which have long been felt to be in an unsatisfactory and anomalous condition.

The system of granting leave on full pay to certain classes of officers on return from foreign service has been extended so as to include all commissioned officers below the rank of flag officer, and also warrant officers.

A new system has been inaugurated under which the Admiralty may at their discretion grant sick leave on full pay for a maximum period of three months to officers who become unfit for service at home or abroad from causes beyond their own control.

It has been found necessary to meet the immediate requirements of the Fleet by entering fifty more officers from the Mercantile

Marine, in order to tide over the interval which must elapse before a sufficient supply of executive officers trained up in the Service has been produced in the ordinary course. Such officers will, as before, be put on a separate list, and the provisions of the Order in Council governing the previous entries will be applicable to them.

The examination for the entry of engineer students, and the regulations governing the course of training at Keyham College and in the dockyard, have been revised.

Owing to the scarcity of shipwright ratings, a scheme will be brought into force in April next for training shipwrights for the Navy in Her Majesty's dockyards. On completion of their training they will be drafted to sea-going ships, and after serving in the Service afloat for a certain number of years they will be eligible to be taken on the establishment of the dockyards. About 150 naval shipwright apprentices will be entered by open competition during the coming year.

Arrangements have been made with the Queenstown Sea Baths and Recreation Company by which a swimming bath will be available under certain conditions for the boys on board the training ship Black Prince, for learning to swim. Similar arrangements have been made at Queensferry for the Caledonia, and a swimming bath is being built at Portland for the training ships there.

THE ROYAL MARINES.

2871 recruits were raised for the corps during 1898. Of these 572 were drafted to the artillery branch, the remainder were trained for the infantry.

The average height of the artillery branch was maintained at 5 ft. 7½ in. for youths under 20, increasing by an additional inch for men above 20. Growing lads for the infantry branch were accepted at 5 ft. 5½ in., a higher standard being exacted for men who had passed the age of 20. Physically the recruits were of the average type usually accepted for the corps of Royal Marines.

The waste of the corps for the year amounted to a total of 2138, including nearly 200 men who were transferred to serve as stokers, ship's police, artificers, and in other ratings, at their own request.

It has been decided to increase the net pay of the Marine on shore by 2*d*. a day. The deduction of 7*d*. now made for rations and groceries from his pay of 1*s*. 2*d*. will be reduced to 4*d*., while on the other hand the 1*d*. a day for beer money will be abolished. His net pay on shore will accordingly in future be 10*d*. in place of 8*d*.

The barrack room accommodation at Walmer is still insufficient for the quartering of the whole of the recruits at the Depôt, and the temporary removal of the Royal Marine Artillery recruits to Eastney therefore remains in force. The recent addition of three blocks for 500 men has afforded scarcely adequate relief. The building of a new hospital is now in course of progress, and it is hoped will be finished this year. The old hospital will then become available as a barrack.

In consequence of the increase in the Royal Marine Artillery, and of the removal of the artillery recruits from Walmer, more barrack room accommodation became necessary at Eastney, and this was found by temporarily appropriating a portion of the married dormitories and quarters until more suitable rooms could be found. Provision is made in next year's Estimates for converting certain married quarters into barrack rooms for single men.

The rifle ranges at all divisions except Plymouth now afford sufficient safety for carrying out individual target practice with the Lee-Metford arm. At Plymouth there is still no range available, but possibly the Lydford Army Range, now in course of preparation by the War Office, will be able to provide for naval wants before the year is out. Meanwhile the musketry practice of the men of the Plymouth division is being carried out at Gosport.

The average number of non-commissioned officers and men on shore during 1898 was 7079. Of this number over 6000 were put through the annual course of musketry training.

Many improvements have been carried out in the batteries, both in the supply of modern guns and in the facilities afforded for carrying out the instruction in ammunition. Certain old pattern breech-loading guns, which are still in the several batteries, will be gradually replaced by quick-firing guns as they become available for this service.

Two battalions of the corps took part in the army manœuvres on Salisbury Plain in August and September, 1898.

Royal Naval Reserve.

The total number of executive officers now on the active list, who have served for twelve months or more in the Navy, or who are now undergoing twelve months' training, is 243, an increase of eighteen since last year, notwithstanding that thirty-five of these officers have been appointed to be supplementary lieutenants and sub-lieutenants in the Royal Navy.

In the Estimates for 1898–99 provision was made for increasing the Executive Officers' List by 100. The additional officers have all been appointed, and there are now no vacancies, while 175 candidates are on the list of applicants for appointments.

By Order in Council of the 19th May, 1898, an increase of 100 in the Engineer Officers' List was sanctioned, raising it to 400 officers in all. 351 officers are now borne, and it is anticipated that the List will be complete in a year at the present rate of volunteering.

The experimental Instructional Classes for Engineers in the Home Dockyard Reserves having proved successful, regular classes have now been instituted, to commence in February, June, and October each year. For the February course this year, eighteen officers applied and six (the number authorised) were appointed.

During the year ending December 31st, 1898, the enrolments in the Royal Naval Reserve were 2757, including 621 firemen and 100 boys.

The numbers borne on December 31st, 1898, as compared with the numbers voted for the financial year 1898-99, were :—

—	Voted.	Borne.
Qualified Seamen, and 1st Class (old system)	11,000	10,836
Seamen Class and 2nd Class (old system)	11,000	11,696
Boys	300	303
Firemen	3500	3306
Totals	25,800	26,141

An increase of 1000 seamen is proposed for 1899–1900.

During the year ending December 31st, 1898, 1,711 seamen were embarked for six months' training in Her Majesty's ships. On that day 810 of these men were so serving. It is expected that 1800 men will have been embarked during the financial year ending March 31st, 1899, an excess of 600 men over the number estimated. Provision has been made in the Estimates for 1898-1900 for the embarkation of 2000 men.

The result of the entries in the new seamen class has been very satisfactory, the men being largely drawn from the fishing population throughout the United Kingdom. The coastguard ships have been kept up throughout the year to their full complement of Royal Naval Reserve men, while the remaining men, to the number of 588, have

been sent to the Channel, Mediterranean, and North American Stations.

The men as a rule have been well reported on. They are very amenable to discipline and take much interest in their instruction. On completion of their period of training and passing the examination 771 seamen were promoted to the Qualified Seamen Class.

To enable the men to keep a smarter appearance, an increased allowance of clothes has been granted.

The entry of boys into the Reserve has been stopped. They are not available for service in the Fleet in the event of emergency, and only about 60 per cent. of them remain in the Reserve on promotion to seamen at the age of 19.

The drill ships' armaments having been completed in accordance with the plan arranged a few years ago, further improvements are now being effected, and a scheme for supplying each drill ship and battery with a 6-in. quick-firing gun is being carried out.

The difficulty of getting dock accommodation for a modern cruiser in London and in other mercantile ports is so great that as a tentative measure a modern torpedo gunboat has been placed in the Thames at Gravesend, which takes firing classes to sea whenever a class is ready, and it has proved so far very satisfactory. Officers now have the opportunity of firing from a gunboat under way whenever they go through their drill in the President. It is proposed to put another gunboat at Portishead for the purpose of training the officers and men at Bristol.

Mobilisation.

No manœuvres were held during 1898, but the coastguard and port guardships were completed for sea in the summer and autumn, and despatched on independent cruises.

During November the coastguard and port guardships were again mobilised.

Several important additions to the Fleet in Commission have been made. The first-class battleships Victorious and Barfleur were transferred to the China Station; two other first-class battleships, Hannibal and Illustrious, being commissioned to take their places in the Channel and Mediterranean Squadrons respectively. The first-class cruiser Terrible was commissioned for special service. Devastation (second-class battleship) was added to the Mediterranean for service at Gibraltar; and the special service vessels of light draught, Woodcock, Woodlark, Sandpiper, and Snipe, were sent to the China Station for river service.

In order to avoid delay in case of mobilisation, arrangements have been made to keep up a stock of clothing ready for immediate issue for 10,000 Royal Naval Reserve men and pensioners.

New Construction.

All the vessels proposed to be commenced during the financial year under the original programme, 1898–99, have been begun.

Of the vessels included under the Supplemental Programme the four battleships and two of the cruisers have been ordered, and tenders for the remaining two cruisers have been invited. Tenders for the twelve destroyers have been received and are now being considered. It was not possible to complete these arrangements at an earlier date, having regard to the preparation of the necessary designs and specifications, and to the large amount of current work on new construction.

Expenditure and progress on ships building have been greatly influenced by the unprecedented activity in mercantile shipbuilding which has followed the settlement of the labour difficulties that so seriously affected the work of last year. The disarrangement of work arising from those difficulties has produced a sensible effect on the completion of ships in 1898–99, the most serious result being the great delay experienced in the supply of steel and other materials required by private firms to whom Admiralty orders have been given. This has been especially felt in the case of ships commenced in private yards in 1898–99. The dates of laying down the ships were consequently later, and the sums earned on these vessels have fallen below what would have been earned under ordinary conditions.

The manufacture of armour has been affected by the fact that the introduction of a new and superior quality has necessitated the reconstruction of plant, and involved many difficulties only to be overcome by experience. The output has been greater during the current year as compared with 1897–98, but the anticipation of the Admiralty that there would still be a temporary limitation of the supply has proved to be correct. All the manufacturing firms have been kept full of orders, and urged to increased production, but the earnings for the present financial year will fall considerably below the sum provided in the Estimates.

It is hoped that in the coming financial year 1899–1900 a larger output of armour will be available.

On contract work generally (including armour, hulls, machinery, gun-mountings, &c.) the various hindrances above mentioned will

cause the aggregate earnings to fall short by about £800,000 of the estimated amount. On ships previously ordered, which were in stages of construction less affected by the peculiar conditions of the year, excellent progress has been made, and in some cases the amounts earned have exceeded expectations. Moreover, in some instances, where the commencement of work was delayed considerably, very rapid progress has been made since, and it may still be hoped that the contract dates for completion will be kept.

New ships building in the dockyards have not been so sensibly affected by the same difficulties so far as the hulls are concerned, but they have necessarily suffered by the delay in the delivery of machinery and armour, &c., from contractors. All that has been possible has been done to minimise the inconvenience by advancing the dockyard work in other directions. Extra expenditure on labour and ordinary materials for new construction and on repairs in the dockyards will to the extent of about £360,000 absorb the short earnings on armour and other contract work.

Battleships.

The battleships Hannibal and Illustrious (Majestic class), which were practically ready for service at the end of the last financial year, were commissioned soon afterwards.

Of the Canopus class two (the Canopus and Ocean) will be completed and ready for trials about June next; the Goliath will follow about three months later; and the Albion and Glory will, it is anticipated, be delivered by the contractors in time for completion before the close of the financial year 1899–1900. The last vessel of the class, Vengeance, is being rapidly advanced, and, according to the contract, will be delivered in July, 1900.

Of the Formidable class two (the Formidable and Irresistible) were launched before the end of 1898, and the Implacable is to be launched this month. In this case the rate of advancement has exceeded expectation. My statement of last year indicated the possibility that the three slips thus rendered vacant might not be available for laying down later vessels of the class before the beginning of 1899–1900. As a matter of fact the building of the London was commenced early in December, 1898, the Venerable on 2nd January, 1899, and the Bulwark will be laid down immediately after the launch of the Implacable.

These six vessels form a group identical in speed, armament, and dimensions; the three latest vessels having slightly modified arrange-

ments of the protection at the bow. The class has already been described to Parliament. The ships are really "improved Majestics," with new and more powerful types of guns and armour of the latest quality, associated with higher speed and water-tube boilers.

The four battleships recently ordered under the Supplemental Programme are intermediate in size between the Formidable and Canopus classes, and have practically the same armament as the Formidable, but are to have superior speed and thinner armour. They are to be known as the Duncan class. The following are their principal features:—Length between perpendiculars, 405 ft.; breadth, extreme, 75 ft. 6 in.; mean draught, 26 ft. 6 in.; displacement, 14,000 tons; speed (with natural draught), 19 knots; I.H.P., 18,000. Armament: four 12-in. B.L. guns in two barbettes, twelve 6-in.Q.-F. in casemates, twelve 12-pr. Q.-F., six 3-pr., four torpedo-tubes. Stability and buoyancy will be secured by vertical side-armour 7 in. thick extending over a considerable portion of the length, and continued in a gradually reduced thickness to the bow. The barbettes for the 12-in. guns will have 11-in. armour, and the casemates for the 6-in. guns, 6-in. armour. All armour will be of the latest and most improved quality, possessing much greater defensive power in proportion to its thickness than armour used in the Majestic class. Belleville boilers, with economisers, will be fitted. The speed of 19 knots exceeds that of preceding battleships in the Royal Navy, and is to be obtained on an eight hours' trial with natural draught in the stokeholds. For continuous steaming at sea in smooth water and with clean bottoms it is estimated that about 18 knots should be maintained. The coal carried will be 900 tons at normal draught, and the bunker capacity will be 2000 tons. In these respects the new ships are practically identical with the Majestic and Formidable classes.

First-class Cruisers.

Of the eight vessels belonging to the Diadem class which were in hand at the beginning of 1898–99, two (the Diadem and Niobe) are in commission; the Europa has been for some time complete and in the Fleet Reserve; the Andromeda and Argonaut have completed their trials, and will be ready for service by the end of the present financial year.

The Ariadne has finished her steam trials, and will be completed at an early date; the Amphitrite has been delivered by the contractors, and her trials will shortly take place. The Spartiate is being advanced at Pembroke. All these vessels will be ready for service in 1899–1900.

Six armoured cruisers of the Cressy class are building by contract; two of these have been ordered in 1898–99, as part of the New Programme of four armoured cruisers included in the Estimates of that year. The difficulties in the supply of materials greatly delayed their commencement, but good progress is now being made, and there is no reason to doubt that the contract dates for delivery will be kept.

Four large armoured cruisers have been ordered recently, of which two belong to the original Programme for 1898–99, and two to the Supplemental Programme. A general description of the designs was given to Parliament when the latter Programme was introduced in July, 1898. The type will be known as the Drake class. The following are their principal features:—Length between perpendiculars, 500 ft.; breadth, extreme, 71 ft.; mean draught, 26 ft.; displacement, 14,100 tons; speed (with natural draught), 23 knots; I.H.P., 30,000. Armament: two 9·2-in. guns, with armoured shields, sixteen 6-in. Q.-F. guns in casemates, fourteen 12-pr. Q.-F. guns, three 3-pr., 2 torpedo-tubes. The 9·2-in. and 6-in. guns will be of the latest and most powerful types, with armour protection equal to that of the Powerful class. Buoyancy and stability will be secured by vertical side-armour, about 6 in. thick, associated with strong steel decks, as in the Canopus and Cressy classes. The bows of the new vessels will be more strongly defended. The steel hulls will be unsheathed. Belleville boilers, with economisers, will be fitted. Twin screws will be adopted. The speed of 23 knots is to be maintained for eight hours on the contractors' trials, with natural draught in the stokeholds. For continuous steaming at sea in smooth water 21 knots should be maintained. The coal-bunker capacity will be 2500 tons, and 1250 tons are to be carried at the speed trials. One of these vessels is building at Pembroke, and the remaining three by contract.

Two other cruisers were included in the Supplemental Programme. They will be of a new design, and tenders have been invited for their construction. Their principal features are as follow:—Length between perpendiculars, 440 ft.; breadth, extreme, 66 ft.; mean draught, 24½ ft.; displacement, 9,800 tons; speed (with natural draught), 23 knots; I.H.P., 22,000. Armament: fourteen 6-in. Q.-F. guns, four in turrets, ten in casemates; ten 12-pdr. Q.-F. guns, three 3-pdr., two torpedo-tubes. The 6-in. guns will be of the latest type, and will be protected by armour about 4 in. thick. Vertical side armour of the same thickness will be carried over a considerable portion of the length, with thinner armour on the bows. Strong protective decks will be associated with this side armour. The steel hulls will

be unsheathed. Belleville boilers, with economisers, will be fitted. The speed of 23 knots is to be maintained for eight hours on contractors' trials. For smooth water continuous steaming at sea about 21 knots should be maintained. The coal-bunker capacity will be for 1600 tons, and 800 tons are to be carried on the speed trials.

Second-class Cruisers.

Two of the three vessels of the Arrogant class in hand at the beginning of 1898–99, namely, the Furious and Vindictive, have been completed, and one of them, the Furious, has been in commission since July last. The third, the Gladiator, will, it is anticipated, be completed this financial year.

Three vessels of the improved Talbot class (Hermes), building by contract, have been well advanced during 1898–99, and will be completed early in the next financial year. The Hermes will be delivered this month.

Third-class Cruisers.

Of the ten third-class cruisers of the Pelorus type, which were in hand on the 1st April, 1898, the Proserpine, Pactolus, and Pegasus have been completed and are in commission. The Psyche, Pomone, Perseus, and Prometheus will be completed very early in the next financial year. The remaining two vessels will be completed before the end of the year.

Sloops and Gunboats.

Six sloops of the Condor class are in hand. Two of these are to be completed early in the next financial year; the others will be considerably advanced. The four twin-screw gunboats (Dwarf class), building by contract, are approaching completion.

Torpedo-boat Destroyers.

The Supplementary Programme provided for twelve additional torpedo-boat destroyers. Orders for them will be placed before the end of the present financial year.

Of the forty-two destroyers of 26 to 27 knots speed, two did not

complete their trials successfully with locomotive boilers, and water-tube boilers are now being fitted. It is hoped that they will be ready for service during next summer.

Of the fifty vessels of 30 knots speed which have been ordered in previous years, thirty-one have been tried and delivered, and another has been tried and will soon be delivered. The remaining eighteen are well advanced, and some have passed their preliminary trials.

Four experimental vessels of still higher speeds have been ordered. Two of these are under trial. One has been fitted with a steam-turbine, but the trials will not be made for some time. The fourth vessel has not yet been commenced.

New Royal Yacht.

This vessel has been considerably advanced at Pembroke. The launch will take place in May, and it is anticipated that she will be ready for her steam-trials towards the end of the year. Her completion is probable in the early summer of 1900. The principal particulars are: length between perpendiculars, 380 ft.; breadth extreme, 50 ft.; mean draught, 18 ft.; displacement, 4700 tons; I.H.P., 11,000; speed, 20 knots.

NEW SHIPBUILDING PROGRAMME.

In the coming financial year it is proposed to commence in the dockyards—

2 Battleships (design not decided).
2 Armoured first-class cruisers, 9,800 tons.
3 smaller cruisers (design not decided).
2 Sloops.

By contract it is proposed to build two first-class torpedo-boats to replace others struck off the list.

The two sloops to be laid down are to be in their general character similar to the Phœnix and Algerine. They will be propelled by twin screws, and be of moderate draught suitable for river service.

Reconstruction and Repairs.

The following ships have been or will be completed in the yards during 1898–99 :—

Dreadnought.	Bellona.
Forte.	Marathon.
Brisk.	Seagull.
Cossack.	Collingwood.
Tartar.	Cambrian.
Superb.	Blonde.
Edinburgh.	Calypso.
Pylades.	Salamander.
Buzzard.	Sheldrake.
Dolphin.	Æolus.
Comus.	Charybdis.
Crescent.	Retribution.
Orlando.	Spartan.
St. George.	Rainbow.
Sybille.	Philomel.

The following ships are in hand :—

Hecate.	Blanche.
Speedy.	Blake.
Active.	Astræa.
Scout.	Cordelia.
Pique.	Partridge.

The work in the Royal dockyards continues to be performed in a satisfactory and economical manner. The naval yards abroad have been fully employed in carrying out the work of repairing ships for re-commission, and also the ordinary necessary repairs, etc., to commissioned ships.

Particulars of the repairs and refits to be carried out in 1899–1900 are given in the Appendix to the Estimates.

Machinery and Boilers.

Between the date of issue of last year's statement and the 1st of April, 1898, the battleship Illustrious and nine torpedo-boat destroyers passed through their trials.

The following vessels have completed their contract steam-trials during the present financial year :—

First-class cruisers.—Niobe, Europa, Andromeda, Argonaut, and Ariadne.

Second-class cruisers.—Furious, Vindictive, and Gladiator.

Third-class cruisers.—Pegasus, Pactolus, Prosperine, Psyche, and Pomone.

Eight torpedo-boat destroyers of 30 knots speed, and two of 27 knots.

The trials of the third-class cruiser Perseus will probably be completed before the end of the current financial year.

The torpedo-boat destroyer Dasher has been re-boilered, and passed successfully through her trials. The third-class cruiser Barham and torpedo-gunboat Seagull have also been re-boilered, and it is expected will pass through their trials this financial year. The torpedo-gunboats Salamander and Sheldrake have been re-boilered, and passed their trials satisfactorily.

The Salamander, fitted with Mumford type of boilers, is in commission on the Mediterranean Station, and experience of this type on service is being watched.

The Sheldrake, fitted with boilers of the Babcock and Wilcox type, which, in regard to diameter of tubes, is intermediate between the large and small diameter tube types, has been commissioned, and is being put through a series of sea-going trials similar to those carried out in the Sharpshooter in 1894–95.

The Diadem made, on commissioning, a run of 57 hours at a speed of 19·7 knots, and 14,933 I.H.P., or 90 per cent. of maximum power. Recently she made the run from Gibraltar to the Nore in 69 hours at a speed of 19·27 knots, and an average I.H.P. of 14,268, or 86·4 per cent. of her maximum power.

All ships fitted with Belleville boilers, except the first seven, are fitted with economisers similar to those in the Diadem.

Naval Ordnance.

The manufacture of guns is proceeding satisfactorily, and the production is keeping pace with the requirements of the Fleet.

A design of a new and more powerful 12-in. B.L. wire-gun has been approved. The first gun has been delivered, and is now under trial. This type of gun will be mounted in the Formidable class of battleships.

A new design of 9·2-in. B.L. wire-gun has also been approved. The first gun is under manufacture, and not yet completed. It is intended to mount this type of gun in the armoured cruisers of the Cressy class and of the Drake class.

The conversion of 6-in. B.L. guns to quick-firers for sea-going ships will be completed by the end of the present financial year. Provision has been made to convert similar guns to quick-firers for the Royal Naval Reserve batteries and drill ships.

The supply of the magazine rifle to the whole of the Naval services has now been completed.

The output of ammunition by the trade and the ordnance factories has been equal to the requirements of the Navy during the past year, and no difficulty would be experienced in obtaining still larger quantities if at any time such increase should be found to be necessary.

Considerable progress has been made in the issue of cordite cartridges to the Fleet for Q.-F. guns, and the policy of supplying cordite ammunition for heavy B.L. guns is being continued.

As regards the production of cordite, there is no difficulty in obtaining all that may be required. At the present time, in addition to the Government factory at Waltham, three private firms are employed in the manufacture of cordite for the Navy. The area of supply could be still further widened if occasion required it.

Trials with improved types of projectiles, necessitated by the recent developments in armour, have been in progress, and satisfactory results have so far been obtained, though the trials are not yet completed.

As each year passes, the necessity of replacing torpedoes of the earlier types becomes more apparent. A considerable number of the later type have been supplied during the past year.

The manufacture of gun-mountings of all types is proceeding satisfactorily, and the results obtained at prize-firing show that the rapidity of fire of heavy guns is most satisfactory. In the mountings now under construction it is hoped that these results will be still further improved.

NEW WORKS.

New Works in the Estimates.

The principal new works for which provision is made in the Estimates for 1899–1900 are—

At Chatham, a new building slip and a new foundry. It has been found impossible to reconstruct the old foundry, owing to the failure of the foundations.

At Portsmouth, the extension of No. 5 Building Slip and the construction of a new smithery.

At Pembroke, a new smithery.

At Wei-Hai-Wei it is proposed to begin the establishment of a Naval depôt. Dredging operations have been already commenced.

For hospitals a considerably increased expenditure is again required to provide accommodation for the increased numbers borne, and to improve the existing buildings.

Works in Progress.

The lengthening of No. 5 Dock at Chatham, the new boiler shop at Portsmouth, and the new mould loft at Devonport have been completed.

At Malta, the work of improving the harbour by dredging, and the construction of deep-water wharf-walls in French Creek are being continued. Valuable space has been gained for dockyard use by levelling the Valperga Bastion.

Good progress has been made with the hospital extensions included in the vote for 1898–99.

Progress under the Naval Works Acts.

Inclosure and Defence of Harbours.

Gibraltar.—The Admiralty Mole extension was brought up to water-level throughout its whole length by September 30th last. The quay-wall is making good progress.

The two Titan cranes on the detached mole are at work setting blocks to form the upper structure of the mole, of which about 200 feet has been completed.

On the Commercial Mole the reclamation and wharf-wall are finished. A portion of the new wharf has been opened for traffic.

The whole of the works at Gibraltar have now been transferred to a contractor. The Admiralty Mole extension already affords protection against torpedo attack for its whole length. The detached mole will have made sufficient progress to do the same by March, 1900, and the Commercial Mole by March, 1901. The remaining work, such as quay-walls, heads, lighthouses, coaling-sheds, &c., will be finally completed, in the case of the extension and detached moles, in December, 1902, and, in the case of the Commercial Mole, in June, 1903.

Portland.—Progress is very satisfactory. The contract date for completion up to low-water level is September of the current year, but this date will probably be anticipated.

Dover.—Admiralty Pier Extension.—Fair progress has been made with the Western Workyard. The blockmaking floor, concrete mixers, and cement shed are practically complete, and blockmaking has been commenced.

The workyard Goliath is being erected, and is nearly ready for use.

Some damage was caused to the Revetment Wall of this workyard during the recent gales, but this damage is now being repaired, and the work in the yard has not been hindered.

East Reclamation.—The extension of the Castle Jetty has been proceeded with, and a considerable length has been filled with chalk and decked over, and is now in use for unloading materials.

The cliff excavation has also been proceeded with.

The staging and Trestle Railway has been completed for a length of about 1000 feet, and a start has been made with the Reclamation Wall, the foundations of which have been put in for a length of 500 feet. The concrete block facing, with the concrete-in-mass backing, is being proceeded with at every available tide.

Sandwich, &c.—The Blockyard and other works at Sandwich are now in full swing. The bridge over the Stour has been built, and the railway connection with the main line has been made, thus enabling ballast to be taken direct by rail to the West Workyard at Dover.

The railway connection has been made with Dungeness, and ballast is being delivered for use at the West Workyard at Dover.

Adapting Naval Ports to present needs of Fleet.

Deepening harbours and approaches.

Chatham and Haulbowline.—The dredging is finished.

Portsmouth.—Work is proceeding, but it has been necessary to send four of the dredgers to other places, and progress is therefore slower.

Devonport.—The removal of the Vanguard Shoal and Rubble Bank will be finished before the close of the financial year. Work on the Cremyll Shoal is well advanced, and dredging above Saltash Bridge is in hand.

Keyham Dockyard Extension.—The Cofferdam enclosing the site of the tidal basin and the Cofferdam enclosing the docks and lock have been completed, and the water pumped out of the enclosed area.

The east wall of the closed basin is practically finished, and good progress has been made with the walls of the tidal basin and the west wall of the lock. Work on No. 4 Dock is proceeding, and the excavation of mud on the site of the other docks has been steadily continued.

Portsmouth.—The two new Docks have been in use since June and December, 1896.

Gibraltar Dockyard Extension.—This work was handed over to Contractors in December last. One Dock, with all necessary appliances for docking ships, together with a portion of the new shops, will be ready for use in December, 1901. The date for the final completion of the whole extension is December, 1904.

Hong Kong.—Sharp's Buildings have been acquired, and the War Office has transferred the North Barracks to the Admiralty. The area of the Dockyard and the water frontage have thus been nearly doubled. Work is at present being carried on by the Admiralty, but tenders will be invited from Contractors as soon as possible.

Colombo Dock.—This Dock is to be constructed by the Colonial Government. Work has been begun.

Pembroke Jetty.
Portsmouth—Widening Caisson. } Satisfactory progress has been made.

Haulbowline Improvements.—The bridge over the Camber, pitching slopes of basin, engine-house at slipway and Police Quarters, besides some minor works, have been completed, and the Camber has been dredged. The new Fitting Shop is nearly completed, and the new jetty, for which a contract has been let, is partly finished. The slipway, roads, railways, &c., which are being carried out by departmental labour, are nearly completed.

Naval Barracks, &c.

Chatham Naval Barracks.—The War Office handed over the site of the Brennan Torpedo Factory in October. Good progress has been made with the new blocks of buildings.

Sheerness Naval Barracks.—The proposal to build new barracks for the Gunnery School at Sheerness has been abandoned, as the only available site was found on examination to be unsuitable on sanitary grounds. Negotiations for a site at Chatham are in progress.

Portsmouth Naval Barracks.—A contract has just been made for this work. An agreement has been made with the War Office for the future transfer of the Garrison Hospital and its grounds to the Admiralty.

Keyham Naval Barracks.—The Eastern Block of Seamen's Quarters is up to first floor level; the foundations of the Western Block are finished; and the Officers' Mess and Quarters are up to damp course level.

Chatham Naval Hospital.—Tenders are being invited.

Walmer Marine Depôt and *Keyham Engineers' College.*—These works were finished last year.

Dartmouth College.—The land has been purchased, and the preparation of the site and the laying out of the grounds are proceeding. Tenders for the erection of the College will be invited shortly.

Magazines.—Good progress is being made.

Haslar Zymotic Hospital.—Plans have been prepared and tenders will shortly be invited.

Haulbowline Zymotic Hospital.—A contract has been let.

A Bill to make provision for the continuation of these works and for the commencement of certain others will be submitted to Parliament.

GEORGE J. GOSCHEN.

7th March, 1899.

Abstract of Navy

Votes.		Estimates. Gross Estimate.	Estimates. Appropriations in Aid.
	I.—Numbers.		
A.	Total Number of Officers, Seamen, Boys, Coast Guard, and Royal Marines	....	....
	II.—Effective Services.	£	£
1	Wages, &c., of Officers, Seamen and Boys, Coast Guard, and Royal Marines	5,361,017	118,317
2	Victualling and Clothing for the Navy	2,051,712	445,012
3	Medical Establishments and Services	197,890	21,290
4	Martial Law	12,232	32
5	Educational Services	119,756	29,156
6	Scientific Services	82,341	12,841
7	Royal Naval Reserves	271,113	113
8	Shipbuilding, Repairs, Maintenance, &c.:		
	Section I.—Personnel	2,429,815	12,815
	Section II.—Matériel	3,960,000	161,000
	Section III.—Contract Work	6,638,460	37,460
9	Naval Armaments	2,755,585	44,785
10	Works, Buildings, and Repairs at Home and Abroad	806,830	11,730
11	Miscellaneous Effective Services	258,645	10,445
12	Admiralty Office	270,600	9,000
	Total Effective Services . . . . £	25,215,996	913,996
	III.—Non-Effective Services.		
13	Half-Pay, Reserved, and Retired Pay	786,914	12,214
14	Naval and Marine Pensions, Gratuities, and Compassionate Allowances	1,137,936	21,936
15	Civil Pensions and Gratuities	341,893	393
	Total Non-Effective Services . . . £	2,266,743	34,543
	IV.—Extra Estimate for Services in connection with the Colonies.		
16	Additional Naval Force for Service in Australasian Waters—Annuity payable under	95,300	35,000
	Grand Total . . . . £	27,578,039	983,539

Estimates for 1899–1900.

1899–1900.	Estimates, 1898–99.			Difference on Net Estimates.		Votes.
Net Estimate.	Gross Estimate.	Appropriations in Aid.	Net Estimate.	Increase.	Decrease.	
Total Numbers.			Total Numbers.	Numbers.	Numbers.	
110,640	....	....	106,390	4,250	....	A.
£	£	£	£	£	£	
5,242,700	5,105,185	117,185	4,988,000	254,700	....	1
1,606,700	1,921,325	429,625	1,491,700	115,000	....	2
176,600	190,900	23,900	167,000	9,600	....	3
12,200	11,427	27	11,400	800	....	4
90,600	116,027	29,427	86,600	4,000	....	5
69,500	79,629	12,429	67,200	2,300	....	6
271,000	257,113	113	257,000	14,000	....	7
						8
2,417,000	2,230,915	12,915	2,218,000	199,000	....	Sec. I.
3,799,000	3,132,000	161,000	2,971,000	828,000	....	Sec. II.
6,601,000	5,649,440	37,440	5,612,000	989,000	....	Sec. III.
2,710,800	2,584,700	35,500	2,549,200	161,600	....	9
795,100	657,100	7,000	650,100	145,000	....	10
248,200	243,127	10,227	232,900	15,300	....	11
261,600	256,700	9,000	247,700	13,900	....	12
24,302,000	22,435,588	885,788	21,549,800	2,752,200	....	
774,700	764,803	12,303	752,500	22,200	....	13
1,116,000	1,104,808	21,908	1,082,900	33,100	....	14
341,500	333,323	423	332,900	8,600	....	15
2,232,200	2,202,934	34,634	2,168,300	63,900	....	
60,300	95,300	35,000	60,300	....	....	16
26,594,500	24,733,822	955,422	23,778,400	2,816,100	....	

Net Increase £2,816,100

STATEMENT showing the Actual and Estimated EXPENDITURE for NAVAL SERVICES for the Three Years ending the 31st March, 1900.

		£	s.	d.
1897–98	Estimated Expenditure (after deducting Appropriations in Aid)	£21,838,000	0	0
	Additional Estimate (21st July, 1897)	£500,000	0	0
		22,338,000	0	0
	Net Expenditure, as per Final Account	20,848,862	17	9
	Net Surplus (Expenditure less than Estimate)	£1,489,137	2	3
1898–99	Estimated Expenditure (after deducting Appropriations in Aid)	£23,778,400	0	0
1899–1900.	Estimated Expenditure (after deducting Appropriations in Aid)	£26,594,500	0	0

STATEMENT of the Principal Points of DIFFERENCE between the ESTIMATES of 1898–99 and those for 1899–1900.

		£
INCREASES.		
Wages, &c., of Officers, Seamen, and Marines		256,200
Victualling and Clothing		115,000
Medical Establishments and Services		9,600
Martial Law		800
Educational Services		4,000
Scientific Services		2,300
Royal Naval Reserves		14,000
Wages, &c., of Men in Dockyards		191,306
Naval Stores		828,000
Hulls of Ships, etc. (Contract)		356,892
Machinery for Ships and Shore Establishments (Contract)		407,560
Gun Mountings and Air-compressing Machinery (Contract)		206,148
Royal Reserve of Merchant Cruisers		16,400
Wages of Artificers and Crews of Vessels (Naval Ordnance Establishments)		10,581
Guns, Torpedoes, and Gun Cotton		225,775
Inspection, &c., of Naval Ordnance Stores		29,000
Works, Buildings, and Repairs		145,000
Miscellaneous Effective Services (Passage Money, &c.)		15,300
Non-Effective Services		63,900
Miscellaneous Items		20,044
		2,917,806
DECREASES.	£	
Projectiles and Ammunition	77,850	
Small Arms and Miscellaneous Naval Ordnance Stores	23,856	
		101,706
Net Increase		£2,816,100

STATEMENT showing the Total Estimated EXPENDITURE for the NAVAL SERVICE, including Amounts provided in the NAVY ESTIMATES, as well as in the CIVIL SERVICE and other ESTIMATES, for the following Services:—

——		1899–1900.	1898–99.
NAVY ESTIMATES:		£	£
Estimated Expenditure (after deducting Appropriations in Aid)		26,594,500	23,778,400
CIVIL SERVICE ESTIMATES:			
Estimated Expenditure under—			
Class I. Vote 8.—Public Buildings, Great Britain:	£		
Maintenance and Repairs, including New Works, Alterations, &c.	4,620		
Rents, Insurance, Tithes, &c.	8,630		
Fuel, Light, Water, &c.	4,750		
Furniture	1,800		
		19,800	18,700
Class I. Vote 9.—Surveys of the United Kingdom		150	150
„ I. „ 12.—Rates on Government Property		84,800	84,800
„ I. „ 13.—Public Works and Buildings, Ireland:			
Coast Guard, viz.:	£		
Purchase of Sites	—		
New Works and Alterations, including Naval Reserve Stations	7,280		
Maintenance and Supplies	5,637		
Furniture, Fittings, &c.	—		
	£12,917		
Naval Reserve, viz.:			
Maintenance and Supplies	181		
		13,098	15,860
Class II. Vote 8.—Board of Trade:			
Staff and Incidental Expenses in connection with the Royal Naval Reserve Force		3,280	3,150
Class II. Vote 14.—Exchequer and Audit Department (Cost of Audit):	£		
Navy Cash Accounts	6,914		
Expense and Manufacturing Accounts	4,635		
Store Accounts	5,543		
		17,092	16,402
Class II. Vote 23.—Stationery and Printing		71,000	73,000
„ III. „ 1.—Law Charges, England (Net)		3,400	3,270
„ III. „ 7.—Prisons, England and the Colonies:			
Maintenance of Naval Prisoners		3,262	3,262
„ III. „ 13.—Prisons, Scotland		95	109
„ III. „ 20.—Prisons, Ireland		56	59
REVENUE DEPARTMENT ESTIMATES:			
Vote 1.—Customs.—Payment of Navy Wages and provision of funds for District Paymasters of the Coast Guard		162	157
Vote 2.—Inland Revenue.—Analysis of Food, &c.		140	110
Vote 3.—Post Office.—Postage of Official Correspondence (including Parcels)	£ 16,378		
Vote 5.—Post Office Telegraphs.—Official Telegrams and Expenses in connection with Telegraphs (Admiralty Wires, and Services of Clerks)	13,247		
		29,625	28,898
Total	£	26,840,460	24,026,327

Note.—In addition to the Services shown above, an annuity of £16,243 18*s*. is payable to the Commissioners of Woods, &c. from the Consolidated Fund, under the Public Offices Sites Act of 1882 (45 & 46 Vict. c. 32).

VOTE (A.)

NUMBERS of OFFICERS, SEAMEN, BOYS, and ROYAL MARINES Borne on the Books of Her Majesty's Ships, and at the ROYAL MARINE DIVISIONS.

One Hundred and Ten Thousand Six Hundred and Forty.

I.—SEA SERVICE.

Under which Vote Provided.	RANKS, &c.	NUMBERS, ALL RANKS. 1899–1900.		1898–99.		Numbers of all Ranks borne on 1st January, 1899.
Vote 1	**FOR HER MAJESTY'S FLEET**					
	Flag Officers	15		15		
	Commissioned Officers	3,482		3,317		
	Subordinate Officers	810		690		
	Warrant Officers	1,331		1,159		
	Petty Officers and Seamen	69,984		66,828		
	Boys (Service)	3,700		3,700		
			79,322		75,709	74,160
	COAST GUARD.					
	Commissioned Officers	89		90		
	Chief Officers of Stations	237		236		
	Petty Officers and Seamen	3,874		3,874		
			4,200		4,200	4,098
	ROYAL MARINES (for Service Afloat and on Shore).					
	Commissioned Officers	434		415		
	Warrant Officers	32		29		
	Staff Sergeants and Sergeants	1,307		1,283		
	Buglers and Musicians	604		604		
	Rank and File	15,913		15,476		
			18,290		17,807	17,474
	Total		101,812		97,716	95,732
	Net Increase		4,096			

II.—OTHER SERVICES.

Under which Vote Provided.	RANKS, &c.	1899–1900.		1898–99.		Numbers of all Ranks borne on 1st January, 1899.
Vote 1	Naval Cadets	265		265		
	Engineer Students	183		184		
	Pensioners in Home Ships and in the Reserves	990		1,067		
	Boys under Training	6,200		6,000		
			7,638		7,516	7,349
Other Votes	Various Services	..	1,190	..	1,158	1,158
	Total		(a)8,828		(a)8,674	8,507
	Net Increase		154			

	1899–1900.		1898–99.	
Total, Sea Service	101,812		97,716	
" other Services	8,828		8,674	
		110,640		106,390
Net Increase		4,250		

	1899–1900.		1898–99.
(a) Including Officers and Seamen	1,407	—	1,394
" Pensioners (Vote 1)	990	—	1,067
" Pensioners (other Votes)	16	—	15
" Boys (Training)	6,200	—	6,000
" Royal Marines	215	—	198
	8,828	—	8,674

VOTE 8.
SHIPBUILDING, REPAIRS, MAINTENANCE, &c.

I.—ESTIMATE of the SUM which will be required, in the YEAR ending 31st March, 1900, to defray the EXPENSES of SHIPBUILDING, REPAIRS, MAINTENANCE, &c., including the COST of ESTABLISHMENTS of DOCKYARDS and NAVAL YARDS at HOME and ABROAD.

DOCKYARD WORK.

SECTION I.—PERSONNEL.—Two Million Four Hundred and Seventeen Thousand Pounds.
(£2,417,000.)

SECTION II.—MATÉRIEL.—Three Million Seven Hundred and Ninety-Nine Thousand Pounds.
(£3,799,000.)

CONTRACT WORK.

SECTION III.—CONTRACT WORK.—Six Million Six Hundred and One Thousand Pounds.
(£6,601,000.)

I.—SUB-HEADS under which SECTION I., PERSONNEL, of this VOTE will be accounted for.

——	ESTIMATES. 1899–1900.	ESTIMATES. 1898–99.	Increase.	Decrease.
	£	£	£	£
DOCKYARD WORK.				
SECTION I.—PERSONNEL.				
Dockyards at Home.				
A.—Salaries and Allowances . . .	161,014	160,349	665	..
B.—Wages, &c., of Men, and hire of Teams	1,899,827	1,745,384	154,443	..
C.—Wages, &c., of Police Force . .	41,395	40,470	925	..
D.—Contingencies	6,400	6,070	330	..
Naval Yards Abroad.				
E.—Salaries and Allowances . . .	63,000	57,348	5,652	..
F.—Wages, &c., of Men, and hire of Teams	244,811	207,948	36,863	..
G.—Wages, &c., of Police Force . .	12,268	12,416	..	148
H.—Contingencies	1,100	930	170	..
£	2,429,815	2,230,915	199,048	148
Deduct,— I.—Appropriations in Aid	12,815	12,915	..	100
£	2,417,000	2,218,000	199,048	48
		Net Increase .	£199,000 (b)	

(a) These amounts include the sums of £8,403 and £1,271 for pay of Inspectors of Shipwrights at Home and Abroad respectively, which is charged direct to the cost of shipbuilding.
(b) This Vote is increased by a transfer of £1,500 from Vote 1. The real increase is, therefore, £197,500.

NOTE.—Provision has been made for New Construction in the above Vote to the extent of—

Section 1	£1,016,580
„ 2	1,789,250
„ 3	6,049,651
	£8,855,481

VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION II., MATÉRIEL, of this VOTE will be accounted for.

——	ESTIMATES. 1899–1900.	ESTIMATES. 1898–99.	Increase.	Decrease.
	£	£	£	£
DOCKYARD WORK—*continued.*				
SECTION II.—MATÉRIEL.				
Naval Stores.				
A.—Timber, Masts, Deals, &c. . .	118,000	170,000	..	52,000
B.—Metals and Metal Articles . .	1,979,500	1,500,000	479,500	..
C.—Coals for Yard purposes . . .	64,000	60,000	4,000	..
D.—Hemp, Canvas, &c.	200,000	129,000	71,000	..
E.—Paint Materials, Oils, Pitch, Tar, Tallow, Boats, Furniture, and other Miscellaneous Articles. . .	555,000	422,000	133,000	..
F.—Electrical, Torpedo, and other Apparatus	196,500	165,000	31,500	..
G.—Coals for Steam Vessels . . .	750,000	605,000	145,000	..
H.—Freight.	52,000	41,000	11,000	..
I.—Rents, Water, &c., Dockyards at Home, and Naval Yards Abroad . .	31,645	28,750	2,895	..
K.—Gas, &c., Dockyards at Home, and Naval Yards Abroad . . .	13,355	11,250	2,105	..
£	3,960,000	3,132,000	880,000	52,000
Deduct,—				
L.—Appropriations in Aid . . .	161,000	161,000	..	..
£	3,799,000	2,971,000	880,000	52,000
	Net Increase	.	£828,000	

VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION III., CONTRACT WORK, of this VOTE will be accounted for.

——	ESTIMATES.		Increase.	Decrease.
	1899-1900.	1898-99.		
	£	£	£	£
SECTION III.—CONTRACT WORK.				
A.—Propelling Machinery for Her Majesty's Ships and Vessels	2,520,645	2,193,265	327,380	..
B.—Auxiliary Machinery for Her Majesty's Ships and Vessels	64,501	59,321	5,180	..
C.—Hulls of Ships, &c., Building by Contract	2,962,622	2,605,730	356,892	..
D.—Purchase of Ships, Vessels, &c.	..	..	..	..
E.—Repairs and Alterations by Contract of Ships, &c., and their Machinery and Stores	98,460	96,440	2,020	..
F.—Inspection of Contract Work	52,000	52,000	..	..
G.—Gun Mountings and Air-Compressing Machinery	725,232	519,084	206,148	..
H.—Machinery for Her Majesty's Shore Establishments at Home and Abroad	150,000	75,000	75,000	..
I.—Royal Reserve of Merchant Cruisers	65,000	48,600	16,400	..
£	6,638,460	5,649,440	989,020	..
Deduct,—				
K.—Appropriations in Aid	37,460	37,440	20	..
£	6,601,000	5,612,000	989,000	..
	Net Increase		£989,000	

PROGRAMME of the ESTIMATED EXPENDITURE in CASH, and in NET REPAIRS, MAINTENANCE, &c.,

SUB-HEADS under which this ESTIMATED EXPENDITURE will be provisions of Sec. 1 (2), ARMY

	ESTIMATED EXPENDITURE IN				
	Direct Expenditure.				
	Dockyard Work.		Contract Work, Sec. III.	Total Direct Expenditure. (A)	
	Personnel, Sec. I.	Matériel, Sec. II.			
	£	£	£	£	
NEW CONSTRUCTION:					
A.—DOCKYARD-BUILT SHIPS—					
Hulls, &c. (c)	859,030	1,647,175	332,842	2,839,047	1
Machinery	27,140	19,470	754,158	800,768	2
	886,170	**1,666,645**	**1,087,000**	**3,639,815**	3
B.—CONTRACT-BUILT SHIPS—					
Hulls, &c. (c)	126,560	118,555	3,263,885	3,509,000	4
Machinery	..	..	1,520,896	1,520,896	5
	126,560	**118,555**	**4,784,781**	**5,029,896**	6
C.—SMALL VESSELS (d)	3,850	4,050	177,870	185,770	7
TOTAL NEW CONSTRUCTION	**1,016,580**	**1,789,250**	**6,049,651**	**8,855,481** (f) ..	8
D.—RE-CONSTRUCTION, REPAIRS, ALTERATIONS, &c.	718,282	407,300	337,568	1,463,150	9
E.—SEA STORES, COALS, &c.	..	1,383,000	13,962	1,396,962	10
F.—ESTABLISHMENT, INCIDENTAL, AND MISCELLANEOUS CHARGES, UNAPPROPRIATED	..	..	..	..	11
TOTAL	**1,734,862**	**3,579,550**	**6,401,181**	**11,715,593**	12

(c) Including Hydraulic and Transferable Gun Mountings, &c.
(d) Including Harbour Craft, and excluding Torpedo Boats, &c., the value of which is included under other Sub-Heads.
(f) Exclusive of £16,000 provided under Vote 2 for building a new Tank Vessel for Royal Clarence Yard, and for completing a new Tank Vessel for Royal William Yard; also £13,876 provided under Vote 9 for the completion of a new Store Steamer, and various small vessels for conveying Naval Warlike Stores.

VALUES OF STORES issued for SHIPBUILDING, RE-CONSTRUCTION, in the Year 1899–1900.

accounted for in the NAVY EXPENSE ACCOUNTS, under the AND NAVY AUDIT ACT, 1889.

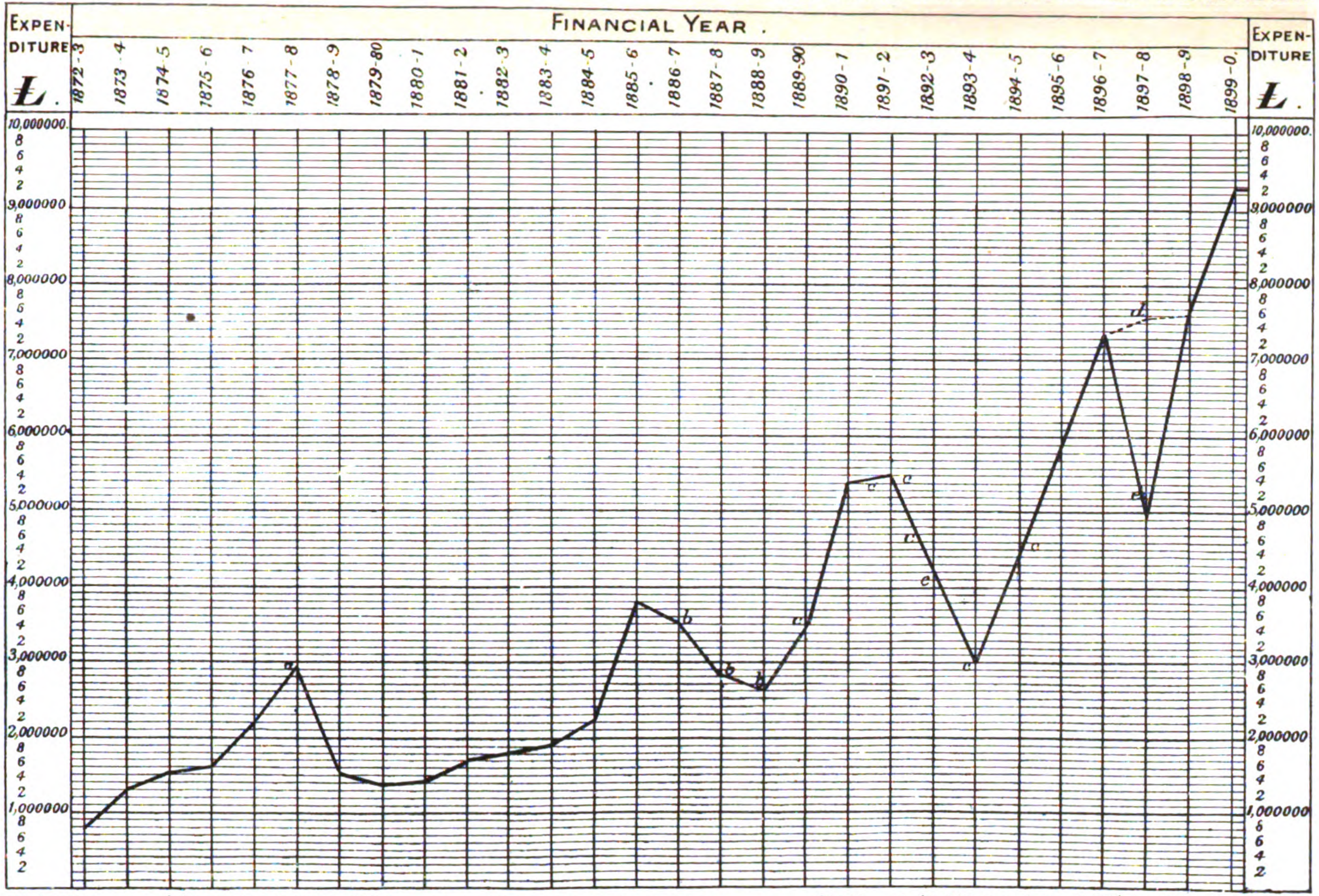
1899–1900.		1898–99.			Difference between Direct Expenditure, 1898–99 (B) and 1899–1900 (A).	
Establishment, &c., Charges, apportioned.	Aggregate, 1899–1900.	Direct Expenditure. (B)	Establishment, &c., Charges, apportioned.	Aggregate, 1898–99.	Increase.	Decrease.
£	£	£	£	£	£	£
272,703	3,111,750	2,529,021	262,127	2,791,148	310,026	..
19,197	819,965	727,899	22,734	750,633	72,869	..
291,900	**3,931,715**	**3,256,920**	**284,861**	**3,541,781**	**382,895**	..
84,459	3,593,459	2,971,509	65,630	3,037,139	537,491	..
22,813	1,543,709	1,388,245	22,676	1,410,921	132,651	..
107,272	**5,137,168**	**4,359,754**	**88,306**	**4,448,060**	**670,142**	..
2,950	188,720	72,023	1,584	73,607	113,747	..
402,122	**9,257,603**	**7,688,697**	**374,751**	**8,063,448**	**1,166,784**	..
144,989	1,608,139	1,115,675	113,175	1,228,850	347,475	..
44,634	1,441,596	1,173,220	43,292	1,216,512	223,742	..
1,299,644	1,299,644	..	1,089,811	1,089,811	..	..
1,891,389	**13,606,982**	**9,977,592**	**1,621,029**	**11,598,621**		

NET INCREASE ON DIRECT EXPENDITURE . . £1,738,001.

RECAPITULATION OF ESTIMATED EXPENDITURE.

HEADS OF EXPENDITURE.	ESTIMATED EXPENDITURE.		ESTIMATED DISTRIBUTION OF THE DIRECT AND INCIDENTAL EXPENDITURE.							
			Naval Construction.					Establishment and Incidental Charges Unapportioned to Ships, &c.		
				Re-construction, Repairs, Alterations, and Refits.						
	Charged direct as Incurred.	Establishment and Incidental Charges Apportioned.	New Construction.	Ships Re-constructing.	Ships for Reliefs, or Re-commission.	Ships in Commission and Reserve.	Stores for Ships, Coals for Steaming, &c.	Fleet, Port, National, and Unappropriated Charges.	Unappropriated Charges (Haulbowline, West India Docks and Deptford, and Naval Yards Abroad).	Total Amount of Estimated Expenditure.
	(a.)	(b.)	(c.)	(d.)	(e.)	(f.)	(g.)	(h.)	(i.)	(k.)
SUB-HEADS OF EXPENDITURE.			A., B., and C.	D.			E.	F.		
	£	£	£	£	£	£	£	£	£	£
SECTION I.—DOCKYARD WORK PERSONNEL .	1,734,862	885,935	1,198,340	..	351,519	446,439	29,835	394,422	200,242	2,620,797
SECTION II.—DOCKYARD WORK MATÉRIEL .	3,579,550	695,394	1,918,797	..	166,097	302,271	1,397,799	345,425	279,615	4,274,944
SECTION III.—CONTRACT WORK . .	6,401,181	310,060	6,140,466	..	159,126	182,687	13,962	79,940	..	6,711,241
TOTAL ESTIMATED EXPENDITURE for 1899–1900 . . . . . £	11,715,593	1,891,389	9,257,603	..	676,742	931,397	1,441,596	819,787	479,857	13,606,982
TOTALS OF SUB-HEADS £	13,606,982		9,257,603	1,608,139			1,441,596	1,299,644		13,606,982

… DURING THE 28 YEARS BETWEEN 1872-73 AND 1899-0.



Hanhart lith

(a) Includes £1,523,000. for purchase of Ships under the Vote of Credit.
(b) Includes Expenditure under Lord Northbrook's Special Programme
(c) Includes Expenditure under the Defence Acts of 1888 and 1889.

(d) Navy Est^{tes} 1897-8. and Supp^{y} 21st July 97
(e) Probable Expenditure 1897-9 when Navy Estimates were moved
Expenditure for 1899-0 is as given in Navy Est^{tes}

LIST of NEW SHIPS and VESSELS Estimated to be passed into the FLEET RESERVE during the Years 1899–1900 and 1898–99.

1899–1900.				1898–99.			
NAME OF SHIP.	Load Displacement in Tons.	Indicated Horse Power.	Number of Guns.	NAME OF SHIP.	Load Displacement in Tons.	Indicated Horse Power.	Number of Guns.
ARMOURED SHIPS:				**ARMOURED SHIPS:**			
Canopus	12,950	13,500	16	Nil.			
Ocean	12,950	13,500	16				
Goliath	12,950	13,500	16				
Albion	12,950	13,500	16				
Glory	12,950	13,500	16				
PROTECTED SHIPS:				**PROTECTED SHIPS:**			
Andromeda	11,000	16,500	16	Niobe	11,000	16,500	16
Spartiate	11,000	18,000	16	Europa	11,000	16,500	16
Ariadne	11,000	18,000	16	Diadem	11,000	16,500	16
Amphitrite	11,000	18,000	16	Argonaut	11,000	18,000	16
Gladiator	5,800	10,000	10	Vindictive	5,800	10,000	10
Hyacinth	5,600	10,000	11	Furious	5,800	10,000	10
Highflyer	5,600	10,000	11	Proserpine	2,135	*7,000	8
Hermes	5,600	10,000	11	Psyche	2,135	*7,000	8
Pandora	2,200	*7,000	8	Pactolus	2,135	*7,000	8
Pioneer	2,200	*7,000	8	Pegasus	2,135	*7,000	8
Pyramus	2,135	*7,000	8				
Perseus	2,135	*7,000	8				
Prometheus	2,135	*7,000	8				
Pomone	2,135	*7,000	8				
UNPROTECTED SHIPS:				**UNPROTECTED SHIPS:**			
Royal Yacht	4,700	11,000	..	Nil.			
Condor	980	1,400	6				
Rosario	980	1,400	6				
Bramble	700	*1,300	6				
Britomart	700	*1,300	6				
Dwarf	700	*1,300	6				
Thistle	700	*1,300	6				
Torpedo Boat Destroyers No. 24	various.			Torpedo Boat Destroyers No. 21	various.		

* Forced draught.

REVISED SUPPLEMENTARY ESTIMATE OF HER MAJESTY'S NAVY, FOR THE YEAR 1898–99.

AN ESTIMATE of the further Amount which will be required during the Year ending 31st March, 1899, beyond the Sum already provided in the Grants for NAVY SERVICES for the Year (Parliamentary Paper No. 62, Session 1898), to meet additional EXPENDITURE arising on the undermentioned Votes.

Three Hundred and Fifty Thousand Pounds.*
(£350,000.)

Vote.	Description.			Amount.
2	VICTUALLING AND CLOTHING FOR THE NAVY:		£	£
	Sub-Head G.—Provisions		50,000	
		£		
	Original Estimate	823,372		
	Revised Estimate	873,372		
	Sub-Head L.—Light and allowances in lieu		6,000	
		£		
	Original Estimate	44,380		
	Revised Estimate	50,380		
	Sub-Head M.—Seamen's Clothing, &c.		88,000	
		£		
	Original Estimate	310,500		
	Revised Estimate	398,500		
	Sub-Head O.—Victualling Stores		6,000	
		£		
	Original Estimate	52,000	150,000	
	Revised Estimate	58,000		
	Deduct,—			
	Sub-Head S.—Appropriations in Aid—			
	Increased sales of Cloth to Contractors to be made up into Garments		6,000	
		£		144,000
	Original Estimate	429,625		
	Revised Estimate	435,625		
8 Sec. II.	SHIPBUILDING, REPAIRS, MAINTENANCE, &c.:			
	MATÉRIEL:			
	Sub-Head G.—Coals for Steam Vessels		140,000	
		£		
	Original Estimate	605,000		
	Revised Estimate	745,000		
	Deduct,—			
	Sub-Head L.—Appropriations in Aid—			
	Receipts on account of the Sale of Ships, unserviceable Stores, &c.		12,000	
		£		128,000
	Original Estimate	161,000		
	Revised Estimate	173,000		
9	NAVAL ARMAMENTS:			
	Sub-Head F.—Guns		100,000	
		£		
	Original Estimate	604,700		
	Revised Estimate	704,700		
	Deduct,—			
	Sub-Head M.—Appropriations in Aid—			
	Receipts on account of the Sale of unserviceable Stores .		22,000	
		£		78,000
	Original Estimate	35,500		
	Revised Estimate	57,500		
	TOTAL . . £			350,000

ADMIRALTY, 28*th February*, 1899.

* The original Supplementary Estimate was for £450,000.—ED.

French Navy Estimates, 1899.

Cap. in French Estimates.	Heads of Expenditure.	Credits asked for the year 1899.*	Credits granted for the year 1898.
		£	£
	PERSONNEL.		
1, 2	Admiralty Office	131,113	130,692
3, 4	Navy Pay	1,846,268	1,710,100
5	Marines	569,236	532,412
6	Gendarmerie Maritime	30,792	30,792
7	Inspection of Administrative Services	10,444	10,212
8	Construction Staff	77,016	75,558
9, 10, 11	Administrative Staff, Commissariat, etc.	265,366	266,932
12	Medical and Religious Staff	88,448	87,600
13	Fisheries and Navigation	26,872	28,552
	LABOUR.		
	Wages—		
14	Shipbuilding; new construction; fitting for sea	598,808	582,750
15	Shipbuilding; repairs	293,600	277,739
16	Armaments; construction of new guns	116,396†	129,670
17	Armaments; repairs	27,680	8,250
18	Works	38,044	36,843
19	Victualling	35,076	35,316
20, 21	Master-attendants' and Storekeepers' Departments	221,720	217,944
22	Miscellaneous	14,896	14,656
	MATÉRIEL.		
	Stores and Supplies—		
23	Admiralty	9,980	9,480
24	Shipbuilding in Dockyards	1,472,488	1,666,544
25, 26	Shipbuilding by contract	1,696,264	1,404,832
27	Fitting for sea; maintenance; repairs	385,000	379,200
	Carried forward	£7,955,507	£7,636,074

* As revised by Committee on Navy Estimates, February, 1899.

† An amount of £11,000 is transferred from Cap 16 to Cap 17, the credits being insufficient in the latter case. Further, a sum of £8,000 is required to replace stores of gunpowder, etc., where defective.

Cap. in French Estimates.	Heads of Expenditure.	Credits asked for the year 1899.	Credits granted for the year 1898.
		£	£
	Brought forward . .	7,955,507	7,636,074
	MATÉRIEL—*continued.*		
	Stores and Supplies—*continued.*		
28	Hydrographic Service. . . .	21,372	—
29, 30	Repairs, conversions, &c., in dockyards and by contract	441,700	432,728
31	Armaments; new guns and conversions.	727,680	647,680
32	Armaments; powder, ammunition and repairs	68,400	72,400
33	Torpedoes	101,920	137,200
34	Works; new and large alterations. .	300,972	234,992
35, 36	Ditto, supplementary for defence of military ports	62,000	74,000
37	Works; repairs	60,920	56,920
38	Clothing	214,488†	188,660
39	Barracks	44,324	25,880
40	Victualling.	942,061	836,456
41	Hospitals, etc.	107,959	107,780
42 to 46	Machinery, tools, etc.	212,732	208,756
47	Fuel and lighting	29,720	29,720
48	Office furniture, printing, etc. . .	21,376*	44,056
	MISCELLANEOUS.		
49, 50	Travelling expenses and freight . . Allowance for lodging, etc. . . .	247,600	241,480
51	Charitable and subscriptions . . .	53,816	50,660
52	Fisheries and Commerce (materials for protection, etc.)	8,468	8,508
53	Pensions	453,292	446,776
54	Secret Service	4,000	3,200
55	Miscellaneous	2,320	1,400
	Total	£12,082,627	£11,485,326

NOTE.—The above Estimates are converted at £1 = 25 francs. At the par rate of exchange, viz., £1 = 25·22 francs, the Credits for 1898 would amount to £11,385,136, and those for 1899 to £11,977,200.

* Cap 48, Hydrographic Service was included under this head last year (see Cap 28).

† Cap 38 includes cost of new clothing for 5107 men, transferred from Army to Navy establishment early in December, 1898. This transfer also affects several other Caps.

PROGRAMME OF NEW CONSTRUCTION, TO BE CONTINUED OR UNDERTAKEN IN 1899.—BUILDING IN DOCKYARDS.

Class.	Names of Ships.	Where Building.	Date of Commencement.	Proposed Date of Completion.	Estimated Cost.	Expenditure proposed for 1899.
					£	£
Battleships . . .	Charlemagne .	Brest . .	1894	1897	1,056,223	51,800
	Saint-Louis . .	Lorient .	1895	1898	1,079,276	126,334
	Gaulois . . .	Brest . .	1896	1898	1,049,394	96,976
	Henri IV. . .	Cherbourg	1897	1900	801,247	199,632
	Iéna (ex A 3) .	Brest . .	1898	1900	1,114,260	292,205
	Suffren (ex A 9) .	Brest . .	..	1901	1,179,715	257,020
	A 8	Brest . .	..	..	..	..
Armoured Cruisers, First-class . .	Jeanne d'Arc . .	Toulon .	1896	1901	856,637	160,702
	Dupetit-Thouars (ex C 3) . .	Toulon .	..	1901	832,288	212,930
	Condé (ex C 4) .	Cherbourg	..	1902	856,328	103,586
	Gueydon (ex C 5)	Lorient .	1898	1901	832,288	225,090
	Gloire (ex C 7) .	Lorient .	..	1898	856,328	108,426
	C 9	Brest . .	..	..	868,625	58,477
	Dupleix (ex D 3).	Rochefort	..	1902	652,353	204,455
	Jurien de la Gravière (ex D 2) .	Lorient .	1897	1900	453,497	124,784
Fast cruiser . .	H 4	Rochefort	..	..	350,658	9,140
Third-class Protected Cruiser .	D'Estrées (ex K 1)	Rochefort	1897	1899	208,041	43,491
First-class Sloop .	Kersaint . . .	Rochefort	1896	1898	119,492	4,360
Torpedo-gunboats.	Dunois . . .	Cherbourg	1896	1898	121,792	8,000
	Lahire . . .	Cherbourg	1896	1899	121,792	28,244
Gunboats . . .	Décidée . . .	Lorient .	1898	1899	59,101	17,419
	Zélée	Rochefort	..	1900	59,101	26,526
Aviso-Transport .	Vaucluse . . .	Rochefort	1886	1901	81,256	..
Submarine Boats .	Morse	Cherbourg	1898	1899	25,989	1,797
	Narval . . .	Cherbourg	1898	1900	25,922	15,360
	Six boats; Q 5 to Q 10 . . .	Various .	..	..	155,532	49,952
First-class Torpedo-boats .	No. 223 . . .	Cherbourg	..	1899	19,261	8,308
	„ 224 . . .	Cherbourg	..	1899	19,261	8,308
	„ 225 . . .	Toulon .	..	1899	18,825	6,327
	„ 226 . . .	Toulon .	..	1899	18,825	6,327
	„ 242 . . .	Saïgon .	..	1901	23,969	7,796
	„ 244 . . .	Saïgon .	..	1902	23,569	3,000
	TOTAL BUILDING IN DOCKYARDS . . .			£	13,940,845	2,468,772

Programme of New Construction, to be continued or undertaken in 1899.—Building by Contract.

Class.	Names of Ships.	Places of Building and Completion.	Date of Contract.	Date of Completion.	Total Estimated Cost.	Expenditure proposed for 1899.
					£	£
Armoured Cruisers First-class	D'Entrecasteaux	La Seyne—Toulon .	Various	1899	678,028	44,848
	Montcalm . .	La Seyne—Toulon .	1897	1901	891,360	285,570
	Sully (ex C 8) .	..	1898	1902	942,940	147,466
	C 10	..	1899	..	942,940	35,296
	Desaix . . .	St. Nazaire—Brest .	1897	1901	711,281	210,080
	Kléber . . .	Bordeaux—Rochefort	1897	1901	711,041	181,128
Fast Cruisers .	Guichen . . .	St. Nazaire—Toulon	Various	1898	619,979	124,144
	Châteaurenault .	La Seyne—Toulon .	Various	1899	618,078	170,802
Second-class Protected Cruiser	Protet . . .	Bordeaux—Rochefort	Various	1898	325,936	48,400
Fast Cruiser. .	H 5	..	1899	..	349,260	16,000
Third-class Protected Cruiser.	Infernet . . .	Bordeaux—Rochefort	Various	1899	193,849	62,000
Torpedo Cruisers	Durandal . .	Le Havre—Cherbourg	Various	1898	67,405	3,400
	Hallèbarde . .	Le Havre—Cherbourg	Various	1899	67,405	11,977
	Fauconneau . .	Le Havre—Cherbourg	1897	1899	67,642	25,012
	Espignole . .	Le Havre—Cherbourg	1897	1899	67,640	25,012
	Pique . . .	Le Havre—Cherbourg	1897	1899	66,903	31,426
	Epée	Le Havre—Cherbourg	1897	1899	66,903	35,426
	Framée . . .	Nantes—Lorient .	1897	1899	66,583	31,426
	Yatagan . . .	Nantes—Lorient .	1897	1899	66,583	25,426
	M 8	..	1899	1901	69,509	8,031
	M 9	..	1899	1901	69,509	8,031
Sea-going Torpedo Boats of 150 tons . . .	Cyclone . . .	Le Havre—Cherbourg	Various	1898	37,910	2,80
	Siroco (ex N 12)	Le Havre—Cherbourg	1898	1900	42,585	18,61
	Mistral (ex N 13)	Le Havre—Cherbourg	1898	1900	42,585	12,20
	Simoun (ex N 14)	Le Havre—Cherbourg	1898	1900	40,905	20,92
	Typhon (ex N 15)	Le Havre—Cherbourg	1898	1900	40,905	18,76
	Trombe (ex N 16)	Nantes—Lorient .	1898	1900	41,085	15,16
	Audacieux (ex N 17) . . .	Nantes—Lorient .	1898	1900	41,085	15,16
	N 18	..	1899	..	42,585	6,52
	N 19	..	1899	..	42,585	6,52
	N 20	..	1899	..	42,585	6,52
	N 21	..	1899	..	42,585	6,52
		Carried forward		£	8,118,174	1,660,63

PROGRAMME OF NEW CONSTRUCTION, TO BE CONTINUED OR UNDERTAKEN IN 1899.—BUILDING BY CONTRACT—*continued.*

Class.	Names of Ships.	Places of Building and Completion.	Date of Contract.	Date of Completion	Total Estimated Cost.	Expenditure proposed for 1899.
					£	£
			Brought	forward	8,118,174	1,660,639
First-class Torpedo Boats, of 86 to 90 tons.	No. 212 . . .	Le Havre—Cherbourg	1897	1898	17,622	1,608
	No. 213 . . .	Le Havre—Cherbourg	1897	1898	17,622	1,608
	No. 214 . . .	Le Havre—Cherbourg	1897	1898	17,622	4,253
	No. 215 . . .	Le Havre—Cherbourg	1897	1898	17,622	4,333
	No. 219 . . .	Chalon-sur-Saône—Toulon . . .	1897	1898	16,305	1,680
	No. 220 . . .	Chalon-sur-Saône—Toulon . . .	1897	1898	16,305	1,684
	No. 227 . . .	Le Havre—Cherbourg	1897	1898	16,809	4,052
	No. 228 . . .	Le Havre—Cherbourg	1897	1899	16,809	6,452
	No. 229 . . .	Le Havre—Cherbourg	1897	1899	16,809	6,452
	No. 230 . . .	Rochefort—Bordeaux	1897	1899	16,731	6,822
	No. 231 . . .	Rochefort—Bordeaux	1897	1899	16,731	6,372
	No. 232 . . .	Rochefort—Bordeaux	1897	1899	16,731	6,372
	No. 233 . . .	Chalon-sur-Saône—Toulon . . .	1897	1898	16,770	1,508
	No. 234 . . .	Chalon-sur-Saône—Toulon . . .	1897	1899	16,770	4,012
	No. 235 . . .	Chalon-sur-Saône—Toulon . . .	1897	1899	16,770	6,412
	No. 236 . . .	Nantes—Lorient . .	1898	1899	16,929	10,212
	No. 237 . . .	Nantes—Lorient . .	1898	1899	16,929	12,612
	No. 238 . . .	Nantes—Lorient . .	1898	1899	16,929	12,612
	No. 239 . . .	Bordeaux—Rochefort	1898	1899	16,849	10,212
	No. 240 . . .	Bordeaux—Rochefort	1898	1889	16,849	12,612
	No. 241 . . .	Bordeaux—Rochefort	1898	1899	16,849	12,612
	No. 243 . . .	Le Havre—Cherbourg	1898	1899	22,569	10,757
Eleven Torpedo Boats 85 tons	P 64 to P 74 .	..	1899	..	198,598	38,564
Six small Torpedo Boats.	D, E, F, G, H, I .	..	1899	..	29,544	17,160
TOTAL BUILDING BY CONTRACT . . . . £					8,724,247	1,861,112

German Navy Estimates, 1899–1900.

(*Converted at* £1 = 20·43 *marks.*)

ORDINARY PERMANENT ESTIMATES.

——	Proposed for 1899–1900.	Granted for 1898–99.
	£	£
Naval Cabinet and Chief Command Department	1,883	1,883
Imperial Naval Office	61,102	52,054
Observatories	14,617	14,190
Accounts	14,762	14,146
Martial Law	1,744	1,715
Divine Service and Schools	3,842	3,235
Military Personnel	759,768	706,429
Maintenance of the Fleet	788,086	658,888
Victualling	46,097	46,848
Clothing	13,975	13,038
Barrack Administration, Cashiers and Accountants	109,429	101,699
Lodging Allowance	58,516	55,518
Medical	54,656	50,694
Travelling Expenses, Freight Charges, &c.	113,625	102,867
Training Establishments	11,585	10,584
Dockyard Expenses	940,560	885,463
Ordnance and Fortification	303,575	272,782
Accountant-General's Department	22,881	21,293
Pilotage and Surveying Services	24,538	23,713
Miscellaneous Expenses	37,356	34,468
Total . . . . . £	3,382,597	3,071,507

SPECIAL ORDINARY ESTIMATES.

Shipbuilding Programme, 1899–1900.

For the Construction of—	£
Cruiser, 1st class, Fürst Bismarck (Ersatz Leipzig), 5th and final instalment	208,027
Battleship, 1st class, Kaiser Wilhelm II. (Ersatz Friedrich der Grosse), 4th and final instalment	209,006
Battleship, 1st class, Ersatz König Wilhelm, 3rd instalment	195,790
„ A, 2nd instalment	269,211
„ B, „	269,211
Large cruiser A, „	133,382
Small cruiser A, „	103,769
„ B, „	103,769
Gunboat, Ersatz Wolf, 2nd and final instalment	36,712
„ Ersatz Habicht, „ „	36,712
Battleship C, 1st instalment	97,895
„ D, „	97,895
„ E, „	97,895
Small cruiser C, „	48,948
„ D, „	48,948
One Torpedo-boat Division, 2nd and final instalment	107,734
„ „ 1st instalment	117,475
Total	£2,182,379

SUMMARY.

—	Proposed for 1899–1900.	Granted for 1898–99.
	£	£
Ordinary Permanent Estimates	3,382,597	3,071,507
Shipbuilding	2,182,379	1,984,091
Armaments and Torpedo Equipments	590,749	527.606
Other Items	164,243	244,329
Extraordinary Expenditure	165,829	145,061
Total £	6,485,797	5,972,594

Italian Navy Estimates, 1899–1900.

FINANCIAL YEAR, 1ST JULY, 1899, TO 30TH JUNE, 1900.

Converted at £1 = 27 lire.

—	Proposed for 1899–1900.	Revised Estimates 1898–99.
ORDINARY EXPENDITURE—GENERAL EXPENSES.	£	£
Admiralty	49,518	41,232
Pensions	184,851	186,281
Expenditure on various services connected with the Mercantile Marine	278,661	243,759
Total . . £	513,030	471,272
EXPENDITURE FOR NAVAL SERVICES.		
Ships fitting out	211,111	210,506
General Staff of the Navy	119,767	123,571
Corps of Constructors	49,815	48,947
Commissariat Service	33,993	34,331
Medical Service	24,867	25,265
Wages—Men	459,259	457,294
Gratuities	45,248	38,456
Assistants to Constructors and others	54,235	50,805
Accountants	52,811	53,478
Police	11,481	11,149
Telegraph Service	6,667	6,273
Telegraph Materials	8,518	6,992
Forts—*Personnel*	11,111	10,771
Victualling	283,333	279,667
Lighting	7,407	7,181
Hospital Services	19,426	18,518
Honorary Distinctions	444	453
Fuel and Stores	194,295	207,709
Salaries and Wages—Workshops and Fortifications	4,672	5,578
Training Establishments	17,037	15,949
Naval Academy	5,334	4,346
Scientific Services—*Personnel*	1,420	1,448
" " *Matériel*	10,778	10,166
Law Charges	1,185	1,209
Transport	23,148	22,676
Materials for repair of Ships	272,592	270,597
Carried forward . . . . £	1,929,954	1,923,335

	Proposed for 1899–1900.	Revised Estimates. 1898–99.
	£	£
Brought forward	1,929,954	1,923,335
Labour for repair of Ships	214,444	210,397
Guns, Torpedoes and Small Arms	311,111	298,565
Labour for construction and repairs of Armaments	82,334	72,677
Works Department—Repairs	90,875	92,729
Construction and Completion of the following Vessels, viz.:		
1st Class Battleships: Benedetto Brin, at Castellamare; Regina Margherita, at Spezia; and E. Filiberto, at Naples		
2nd Class Battleships: Francesco Ferrucio, at Venice, and another at Taranto		
2nd Class Cruisers: Giuseppe Garibaldi, by Messrs. Ansaldo; and Varese, by Messrs. Orlando		
5th Class Cruiser: Puglia, at Taranto	851,852	869,236
6th Class Cruisers: Agordat, at Castellamare; and Coatit, at Naples		
Torpedo-boat Destroyers		
Sea-going Torpedo Boats		
Small Craft		
Total £	3,480,570	3,466,939

EXTRAORDINARY EXPENDITURE.

	£	£
Half Pay	740	756
Shipbuilding	18,518	18,896
Coast Defence and Fortifications	11,111	3,780
Torpedoes	18,518	18,896
Total £	48,887	42,328
Depreciation of Ships in Commission	111,111	113,378
Rent of Lands occupied by Government	121,427	123,905

SUMMARY.

	£	£
Effective Expenditure (Ordinary and Extraordinary)	4,042,487	3,980,539
Depreciation of Ships in Commission	111,111	113,378
Rent of Lands occupied by Government	121,427	123,905
Grand Totals £	4,275,025	4,217,822

N.B.—The Italian Navy Estimates for 1898–99 were converted into sterling at the rate of 26·46 lire per £1. Those for 1899–1900 have been converted at the rate of 27 lire per £1.

Russian Navy Estimates, 1899.

Converted at £1 = 9·6 Roubles.

—	1899.	1898.
	£	£
Central Administration	204,690	190,239
Naval Schools	93,148	78,485
Medical	101,887	93,297
Pay	463,876	453,860
Gratuities and Pensions	52,553	48,058
Clothing	204,494	187,966
Provisions	129,979	107,772
Maintenance of Fleet	1,224,872	1,164,602
Hydrographic Service	103,752	73,567
Guns, Torpedoes, etc.	958,200	866,392
New Construction and Repairs	3,548,181	2,012,185
Workshops and Offices	420,722	455,170
Hire, Construction, and Maintenance of Buildings	373,405	436,768
Equipment of Port Alexander III. and Improvement of Port Vladivostock	541,667	593,750
Expenditure on account of Estimates for 1900	25,770	23,964
Sundry Expenses (including Religion)	205,406	198,300
Total . . . £	8,652,602	6,984,375

United States Navy Estimates, 1899 and 1900.

Converted at £1 = $4·8665 (Par, as adopted by Congress).

Detailed objects of Expenditure and Appropriation.	Estimates, 1899.*	Appropriated, 1899.	Estimates, 1900.
	£	£	£
Pay of the Navy	1,736,167	3,689,604	2,615,111
Pay, Miscellaneous	61,646	82,195	102,743
Contingent Navy	1,438	1,438	4,110
Bureau of Navigation	122,814	153,123	101,741
Naval Academy	48,203	47,874	40,163
Bureau of Ordnance	1,985,934	1,750,652	508,605
„ Equipment	1,659,129	1,667,554	537,440
„ Yards and Docks	80,697	90,971	93,177
Public Works—			
Yards and Docks	1,036,599	1,008,530	1,209,000
Naval Academy	—	102,743	435,632
Naval Observatory	7,028	2,301	2,055
Bureau of Medicine and Surgery	74,304	72,557	39,556
„ Supplies and Accounts	313,457	652,509	661,755
„ Construction and Repairs	645,845	2,170,842	703,464
„ Steam Engineering	239,988	1,320,847	248,207
Marine Corps	244,932	399,703	280,894
Increase of the Navy—			
Construction and Machinery	815,878	2,804,576	1,231,357
Armour and Armaments	874,304	1,471,859	821,946
Equipment	44,180	85,277	41,097
Auxiliary Naval Force	—	616,460	—
Emergency Fund	—	5,137,162	—
Total	£9,992,543	£23,328,777	£9,678,053

* The figures in this column are taken from preliminary copy of Secretary of Navy's Report, and may be revised or omitted in final edition of Report.

NAVAL RESERVES.

I.

The Colonies and the Royal Naval Reserve.

Deputation to Mr. Goschen, First Lord of the Admiralty, July 27th, 1898.

The deputation included Lord Brassey, Lord Loch, Sir Robert Herbert, the Hon. W. Mulock (Postmaster-General of Canada), Dr. Cockburn (Agent-General for South Australia), Lieutenant-General Laurie (Canada), Sir J. Bramston, Sir James Blyth, Mr. Edward Bond, M.P., Mr. Beckett Hill, and Mr. Henry Norman.

Mr. Goschen, in reply, said: I have listened with very great interest to what you have put before me. I may say at once that I sympathise with your object—namely, to encourage the Colonies to assist in the defence of the Empire and to increase the number of its defenders. Now comes the question of how to carry it out. I should be very glad if we could have a considerable addition to our Reserves supplied by the Colonies, upon one condition—that those Reserves should be as good as the Reserves that we have. But I think that, as at present advised, certainly, I would not be inclined to accept from the Colonies a less well-trained and a less satisfactory number of Reserve men to the exclusion of an equal number of better-trained men in the United Kingdom. What you desire is to have in the Colonies men equally trained with those we have at home. I should say one word first as to the expenditure. I think I am not now addressing a body of Colonial gentlemen so much as the British Empire League, and I think it is their duty, while they impress upon us to do what we can for the Colonies, also to impress upon the Colonies that they must bear their share—at least some share—of the defences of the Empire. We cannot go on constantly increasing the enormous naval expenditure, and at the same time take special measures for the Colonies, unless we see some disposition to meet us half-way, and to bear at least a share of the expenditure that we incur. That is a matter of principle with which, I think, you will agree. Now, as to the question of training. I fancy that nearly all

the difficulties which have arisen have been with reference to the difficulty of training seafaring men in the Colonies. Unless that training is satisfactory, of course we could not accept the men. Now, what is the training we have in this country ? We train them at batteries or on board men-of-war for twenty-eight days. We are anxious that we should not have men who are unaccustomed to men-of-war, and in enrolling fishermen in the Colonies for the Reserve we thought it essential that they should have some experience of men-of-war. The present conditions are : The training for twenty-eight days at a battery and afterwards embarking in men-of-war for a period of six months. That is an essential part now of the training of the Reserve. I saw the other day a representative from Newfoundland, and we discussed this matter together in some detail; and I told him the first thing we had got to ascertain was whether the fishermen of Newfoundland would accept the terms which the English Naval Reserve men now accept—and it is the only condition that we accept—that besides the training for twenty-eight days they will go to sea for six months in a man-of-war. I told him that if it were found that they were willing to accept this condition then we should proceed in the matter. With reference to Australia, Canada, and the other Colonies, the first thing is to ascertain whether the men will be prepared to learn the discipline of a man-of-war, as we consider that a necessary matter to make them efficient as a Reserve. I do not wish you to make definitely any offer, but the deputation will see that these two things will have to be arranged: in the first place the training at the batteries for twenty-eight days, and then going to sea for six months. In this country we have batteries all round the coast, and there may be some difficulty in the establishment of batteries for the necessary training in the Colonies. I have spoken of expenditure, and I may say that if the Colonies will bear the expense of training the men we would bear the expense of the retaining fees. At any rate, I am prepared to entertain the question if I see that there is some evidence forthcoming that our Colonial fellow-subjects, the seafaring population, will comply with the same conditions which we consider necessary for efficiency here. I will not underrate the difficulty of twenty-eight days' training, nor going to sea, but we should endeavour to find room and ships at various stations, and afterwards, possibly, assist them in embarking for a spell of real sea service. The difficulty of batteries is, no doubt, very great. The gentleman from Canada spoke of our sending ships, officers, and men, as if we had got an unlimited number; but, as Lord Brassey and others know, our supply is not so great as to send them to all parts of the world for the training of Reserve men. And what

we did for one Colony we should have to do for all. There is, therefore, very considerable difficulty as regards training. The first thing to be done is to see as to how far this difficutly would be met. I will send out our rules applied to the Reserves to the Commanders-in-Chief on the different stations, who will then confer with the various Ministers and Governors, and we will see what the Colonial Governments say to it, and, what is more important, what the seafaring population say to it—whether they will accept the same conditions as those which are now readily accepted in this country. The great change to the requirements of six months at sea is a condition which has been accepted with the greatest approbation by the House of Commons and by all who are interested in the Naval Reserve. We could not make easier conditions for men in the Colonies when we can easily get Reserve men in this country to accept the conditions. I cannot pledge myself to anything definite with regard to the matter, except that the Commanders-in-Chief will put themselves in communication with the various Governments to see how far they are willing to go. We are not in such need of Reserve men, and the supply is not so limited but what we could largely increase it, and I could not promise that we could supply to the various Colonies the apparatus for training at the expense of this country—that is, to build batteries and to supply the instructors and the houses where the instructors might live, which were all matters of very considerable expense. Our organisation is now such that we should be able to train a very much larger number of Reserve men than we have at the present moment. We have 27,000 men, but there are numerous applications from men, and we shall increase the number of our Reserves at home. Therefore it is not the paucity of our numbers that would induce us to go to any great expense. But I acknowledge the value of the Colonies if they would contribute men efficiently trained as an Imperial consideration from many points of view; and, therefore, so far as the organisation is concerned, we will do our best to see whether the development of the Reserve under the conditions I have mentioned is possible. I do not disguise from you that there are considerable difficulties in the matter which have hitherto arrested any progress at all, but I think I have made a fair offer, and an offer which will test the real sincerity, not of the Governments of the Colonies, because I believe that it is sincere, but the reality of the possibility that we should be able to increase to any extent our Reserve.

General Laurie said that he could speak with better knowledge of Canadian fishermen than any other person, as having represented them in the Canadian Parliament, and he could say that there would

be no difficulty in getting the men to go to sea for six months. The Canadian fishermen were largely deep-sea fishermen, who would be at sea for three months at a time, and they would be perfectly free between October and March, and they would be glad to take up a six months' training as required.

Mr. Goschen said he was glad to hear it.

The deputation then withdrew.

II.

Merchant Shipping (Mercantile Marine Fund) Bill.

House of Commons, Wednesday, July 27th, 1898.

Mr. Ritchie, President of the Board of Trade, moved that the Bill be recommended in respect of a new clause (allowance in respect of British boy sailors available for the Royal Navy Reserve). He said that the question of the declining number of British seamen in our mercantile marine was a matter of anxiety to all who had the best interests of the country at heart. There was no doubt that recent criticisms which had been passed on the mercantile marine were justified by the figures bearing on the subject. In 1891 there were 41,590 British sailors on board British ships, but in 1896 there were only 35,020, showing a decrease in five years of 6,570. In 1891 the number of foreign petty officers and seamen on board British ships was 13,432; in 1896 the number had risen to 14,469, an increase of 1,037. Thus the decrease in British seamen in those five years was 15 per cent., while the increase in foreign seamen was 8 per cent. It was not an agreeable thing to know that no less than 30 per cent. of the petty officers and seamen on board British ships were foreigners. He did not dispute the fact that in a large number of cases these foreigners made very good seamen; but he thought they would all prefer that the mercantile marine should be manned by British seamen. (Hear, hear.) A very disquieting feature of the decline to which he had drawn attention was that the decrease was most marked among the younger men. In 1896 there were 3,981 fewer sailors under 25 than in 1891. He did not think it would be necessary for him to enlarge upon the fact that such a state of things was dangerous to our commercial interests and national position. The Naval Reserve depended on having a large field of selection in the mercantile marine, and the mercantile marine itself was largely interested in having a plentiful supply of British seamen, so that in case the Reservists were called out it might not

be dependent on foreigners to man its vessels. At present if the Reservists were called out the mercantile marine would be left almost entirely in the hands of foreign sailors. That constituted a real danger, and he thought the House ought to support the Government in their endeavour to find some solution of the difficulty. The falling-off in the number of British seamen was not caused by any lack of boys. It was true that some parents were unwilling to bind their boys by indentures, but the real difficulty was due to the reluctance of shipowners and masters to carry boys, as they were of little service, at any rate for the first year, and cost almost as much for maintenance as full-grown sailors. The question for consideration was whether anything could be done to remedy a state of things which he believed they all deplored. It appeared to the Government that the Bill before them afforded an opportunity for doing something to remedy the evil. At the stage of second reading and in the Grand Committee many appeals were made to the Government to contribute to the light-service in respect of the ships of Her Majesty's Navy. Many of the arguments used in favour of that proposal were, he admitted, arguments of considerable weight; but the proposal was negatived for this reason, among others, that one of the chief duties of the Royal Navy was to protect the interests of the mercantile marine, to which it rendered very important services. And it was held that this was a fair equivalent, and that the Royal Navy ought not to be called upon to pay light dues. It struck him that possibly they might be able to reconcile these views and at the same time do a considerable amount of good in the direction of securing a larger employment of British sailors in the mercantile marine. The question was—Could not the Government, supposing it gave a large sum of money out of the Treasury, ask the mercantile marine to render to the Royal Navy, which existed so much for their protection, some corresponding service? The training of boys to join the Royal Naval Reserve would not only be helpful to the Navy in supplying it with recruits, but also to the mercantile marine itself. (Hear, hear.) By helping the national defence the owners of British ships would not only be providing for their safety in times of national danger, but also for an efficient supply of British seamen well trained to man their ships. (Hear, hear.) He would give the House an outline of the Government proposal and scale. The Government proposed to give an allowance equal to 20 per cent. of the light dues paid in any one year in respect of any one vessel at the end of each year (during which the vessel must have been not less than nine months with articles of agreement running) to the then owner of that vessel, provided it carries on each voyage "boy sailors" according

to the following scale: Under 500 tons net, one boy; 500 and under 1,000 tons net, two boys; 1,000 and under 2,000 tons net, three boys; and an additional boy for every 1,000 tons, or portion of 1,000 tons. It would not be essential in order to obtain a share of the deduction that the full complement of boys should be carried by any one vessel. The owner of a vessel who has employed a smaller number of boys than that required by the scale for a vessel of its tonnage would be granted an allowance as if the vessel had been of the *maximum* tonnage of vessels for which that number of boys was assigned in the scale. For example, if a vessel of 1,050 tons carried two boys, the owner would receive an allowance calculated as if her tonnage were 999 tons. In order that the allowance might be obtained, each "boy sailor" must be a British subject, not being a Lascar; he must be a deck hand; he must be medically examined by an Admiralty surgeon or agent, and certified to be sound and likely to grow into an efficient volunteer for the "seaman" class reserve (the cost of this examination would be paid out of voted moneys); he must be enrolled in the Royal Naval Reserve, and enter into an agreement to present himself for service when called upon, in accordance with rules issued by the Admiralty; he must be over 15 and under 18 years of age at time of first enrolment, and under 19 at time of signing agreement for any voyage in respect of which the allowance was claimed. No allowance would be granted in respect of any "boy sailor" over 19 years of age or for a longer period than three years from the date of the first enrolment of such "boy sailor." The superintendent of a mercantile marine office, on being satisfied as to the age, nationality, and physical fitness of the boy, would issue to him a book containing a description of his appearance, and blank spaces for recording his employment. This book the boy would produce to the superintendent of a mercantile marine office on every engagement and discharge, whether in the foreign-going or home trade, in order that the necessary entries might be made therein. There would be no enrolment nor would any allowance be made in the case of boys carried as apprentices or midshipmen with a view to being specially trained as certificated officers; nor in respect of boys carried in the engineer's or steward's department. All claims for the allowance would be examined by the Board of Trade before payment was made. That was, generally speaking, the outline of the proposal. With regard to the Admiralty regulations, they were not yet definitely drawn up, but he understood that his right hon. friend the First Lord proposed to open a new class for these boys. If the proposal was taken advantage of to the full, the *maximum* number of boys carrida

would be 16,150 and the amount of the grant would be £62,559. The Royal Naval Reserve would receive an accession of that number if all shipowners availed themselves of the scheme—16,150 boys would be turned out every three years as fully equipped sailors and members of the Royal Naval Reserve. (Hear, hear.) But 2,000 boys were already carried in the mercantile marine, and therefore the number added would be 2,000 less than the number he had given. Even if the scheme was taken advantage of in the case of only half the ships, that would mean an addition of 8,000 to the Royal Naval Reserve every three years, and that would be a most important addition to that force. (Hear, hear.) He thought and hoped that owners would be actuated in this matter not only by financial considerations but also by considerations of the national safety and their own interest. (Hear, hear.) The plan was to be tried as an experiment, but he hoped the result would be such as to enable the Government to continue either the same scheme or something better. At any rate, whether it was a success or not, he hoped the House would see that the Government had made an attempt, and a sincere attempt, to deal with an evil, which was a real evil and which was likely to become a national danger if it was not remedied. (Hear, hear.)

The Bill having been re-committed,

Mr. Ritchie moved the new clause as follows:—

"On proof to the satisfaction of the Board of Trade that a British ship has during any financial year carried, in accordance with the scale and regulations to be made by the Board of Trade with the concurrence of the Treasury, boys between the ages of 15 and 19, there shall be paid to the owner of the ship, out of moneys provided by Parliament, an allowance not exceeding one-fifth of the light dues paid during that year in respect of that ship. Provided that no such payment shall be made in respect of any boy unless he has enrolled himself in the Royal Naval Reserve, and entered into an obligation to present himself for service when called upon, in accordance with rules to be issued by the Admiralty. The scale and regulations aforesaid may be modified from time to time by the Board of Trade with the concurrence of the Treasury. This section shall continue in force until the 31st day of March, 1905, and no longer, unless Parliament otherwise enact."

III.

Navy League Scheme for Training British Boy Sailors.

The necessity for offering the advantages of training to boys of respectable origin, and of good physique and intelligence, is insisted upon as one of the cardinal features of the scheme.

Few persons will question the policy of encouraging boys of a respectable class to enter the mercantile marine; it is therefore desirable to say a few words about the prospects of such boys on the completion of their period of training.

It may safely be assumed that there is always likely to be a steady demand for well qualified able-bodied seamen of the class which the scheme is intended to train. But under the present conditions of service on trading vessels the risk of deterioration in character—partly due to the nature of the employment, and partly due to the apathy with which the British public and Parliament have regarded the merchant seaman and merchant service for so long—has to be considered. With the general improvement of the conditions of service in the Royal Navy there has been improvement in the character of bluejackets, and from that one can see the standard which might be attained when the merchant seaman's welfare becomes in part the care of the State.

The following points are therefore mentioned:—

1. If the lads to be trained come straight from the discipline and influence of the public elementary schools, the present stigma on the antecedents of trained boys would be removed, the tone of the service would be improved, and the insubordination and insobriety of which shipowners complain in the case of British seamen would be largely diminished.

2. If certificates of service are granted to boys trained under the scheme, and these certificates are kept endorsed during their subsequent careers, constant employment for the holder under respectable owners would be ensured.

3. Engagements for a term, and not merely for a voyage, should be encouraged by the Board of Trade.

4. If arrangements are made for ships to be paid off on board at hours not necessarily known except in the ship itself, instead of at the shipping offices, the crew would have a chance of escaping the numerous crowd of crimps and harpies who surround the shipping office when a ship is paid off under the present system.

5. The establishment of Sailors' Homes, like Miss Weston's, should be encouraged.

SCHEME.

(1.) Depôt training ships to be established at suitable points round the coast of the British Isles for the preliminary training of boys in the A B C of the duties of seafaring men.

(2.) The boys to be of good character and of a certain standard of physique and education, to be recommended for the purpose by teachers and managers of public elementary schools, and to enter about the age of fourteen.

(3.) The boys on entering the depôt training ships to be indentured to a public official or officials, nominated by the Board of Trade, for a term of four years, the first to be spent on the depôt ship and the last three on ships of the mercantile marine.

(4.) The boys on entering the depôt training ships to be bound to serve their time and to pass as "qualified seamen" in the Royal Naval Reserve.

(5.) Each depôt training ship to be of a capacity to train at least 300 boys per annum, and the essential object of the training to be to fit the boys for service before the mast; but, at the same time, every channel of promotion to smart and exceptional seamen must be open. The year to be divided into two or three terms, and boys entered in about equal numbers each term.

(6.) The duties of the officials referred to in (3) to be as follows:—

a. To supervise the training ships.

b. To enlist boys under the scheme.

c. To arouse and keep alive the interest and support of local authorities (*e.g.*, Technical Education Committees of County Councils and Elementary Education Authorities) for the scheme.

d. To secure a proper share of Apprenticeship Charities for payment of premiums to shipowners.

e. To make arrangements with respectable shipowners for shipment of the boys on completion of their term in the training ships, and to inspect the ships from time to time.

f. To arrange what premiums are to be paid to shipowners for taking boys, and dates for payment, which should be by annual instalments.

g. To grant certificates of service, and to look after the welfare of the boys on leaving the training ships.

h. To keep proper registers, showing all necessary particulars of the boys' careers, characters, &c.

i. To arrange for their training and qualifying in the Royal Naval Reserve at the proper periods.

j. To arrange for proper accommodation for boys while on shore.

k. Generally to use their best endeavours to make the scheme successful.

(7.) The payments to shipowners to be, say, £1 per month for the first year, 15*s.* per month for the second year, and 10*s.* per month for the third year.

(8.) The boys, while in the training ships, to be clothed and receive a little pocket-money at the expense of the scheme, and to receive pay from the shipowners at fixed rates while serving the last three years of their time.

(9.) The scheme to be managed and the cost provided by the Board of Trade, acting in touch with the Admiralty, who, by contributing to the cost and accepting enlistment in the Royal Naval Reserve of boys joining the depôt training ships, would secure the service of such boys for the Reserve.

(10.) Facilities to be afforded to County Councils and other public bodies having the control of funds available for technical education to apply these funds to the training of boys in the proposed depôt ships.

(11.) The co-operation of trustees having the management of funds available for apprenticing deserving boys to be sought, but charitable contributions from private sources not to be invited nor accepted.

(12.) Sea-going training ships might be provided in connection with the depôt training ships, and rendered to some extent self-supporting by the transport of Government stores, &c. This is a desirable, but not an essential, feature of the scheme.

The Navy League has ascertained by inquiry that a scheme worked out upon these lines is likely to meet with the active support of Technical Education Committees of County Councils, of City Companies, of school authorities, of the Charity Commissioners, and of the better class of shipowners.

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